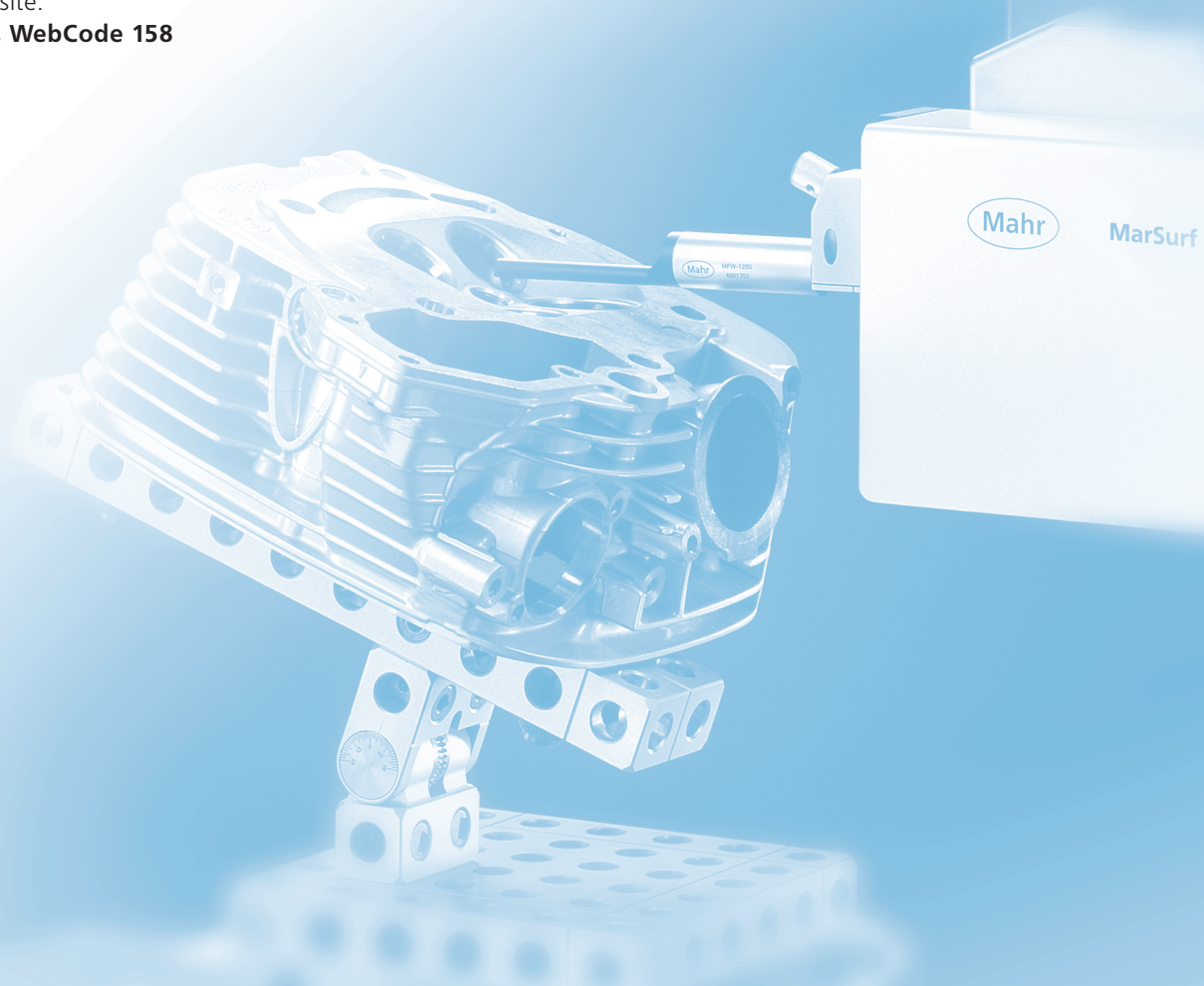


IN THE PAST THERE WAS THE THUMBNAIL TEST. TODAY THERE IS MARSURF.



The latest information on MARSURF products can be found on our website:

www.mahr.com, WebCode 158



▶ | Wherever surface structures influence the function, processing or appearance of components or products, careful testing is essential. But how can surfaces be tested? At the beginning of the 20th Century, experts still had to test by eye and touch. A practiced eye can detect features in the μm range, and even the much maligned thumbnail test delivered perfectly acceptable results. Now however, we live in an age of exchangeable parts, fits and internationalization, where subjective tests like this are no longer adequate. Today, computer-aided measuring instruments provide objective data. Measurement and evaluation have become considerably easier. For decades, Mahr has been a worldwide pioneer in this area, as demonstrated by the company's numerous innovations and patented solutions in the field of surface roughness metrology. The interplay between the stylus, drive and measuring setup plays a key role in influencing the quality of surface measurement tasks. This is where Mahr's core expertise comes in, as demonstrated by the company's numerous innovations and patented solutions. Over this time, we have succeeded in perfecting the stylus method, which is now in widespread use throughout the world. We can meet even the most demanding requirements for non-contact measurement, e.g. where extremely soft materials or ultra-short measuring times are involved, thanks to the range of optical sensors offered in the MarSurf product family. Developed with Mahr quality, expertise and know-how, MarSurf is the solution for all your surface metrology needs.

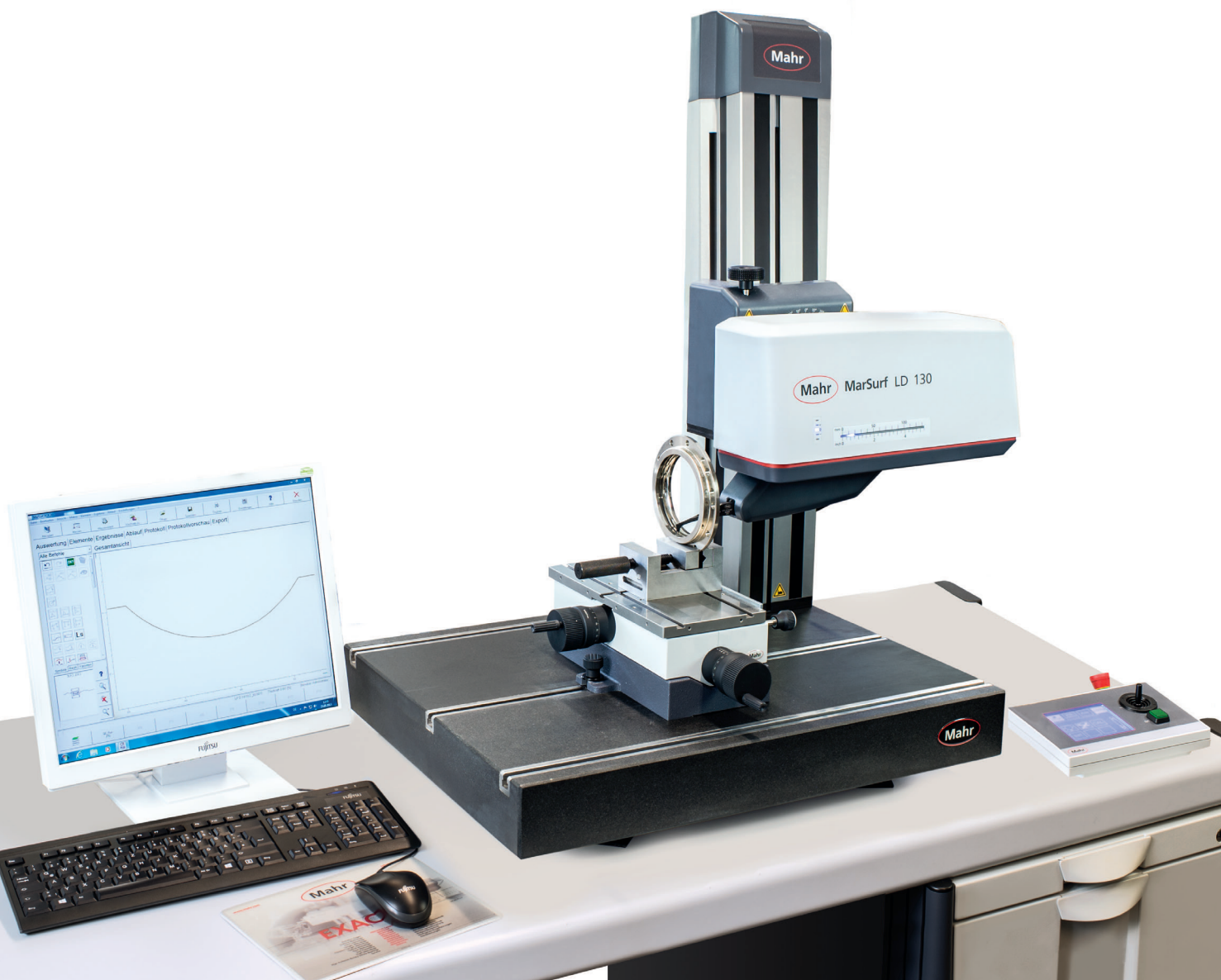
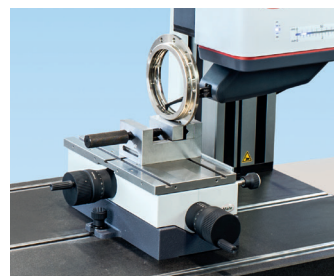
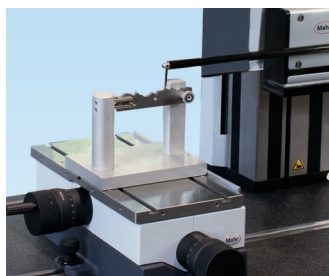
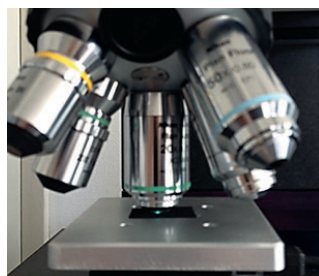
► I MarSurf. Surface Metrology

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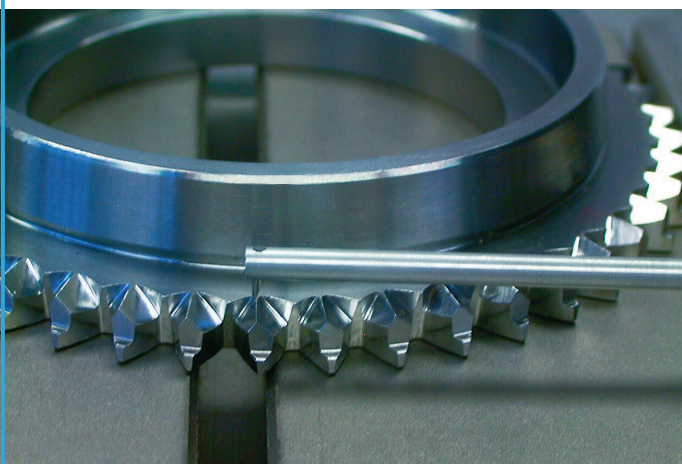
MarSurf. Surface Metrology System for all your industrial requirements

THE RIGHT SOLUTION FOR EVERY TASK

▶ | In surface metrology, a distinction is made between mobile units, stationary shop-floor units and PC-based surface measuring instruments. The latter provide the very best measurement and evaluation performance for surface measurement tasks. They fulfill all the key requirements of a state-of-the-art PC-based measuring and evaluation system, including compliance with international standards, versatile evaluation methods, comprehensive documentation, large storage capacity, data export and import and networking with other systems. Comprehensive QA procedures ensure the highest quality and stability of software and hardware.



Automotive Industry

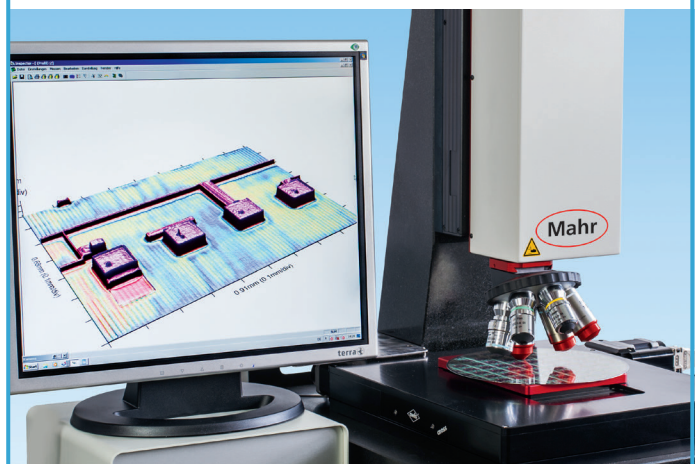


Measurements on synchronizer rings

The automotive industry is often at the forefront of surface and contour measurement. Typical applications include measurements on crankshafts, camshafts, transmission components and engine parts. The measurement of the root geometry including roughness measurement for synchronous rings ensures both easy and smooth gear changing and a long service life.

 WebCode 14953

Electronics Industry

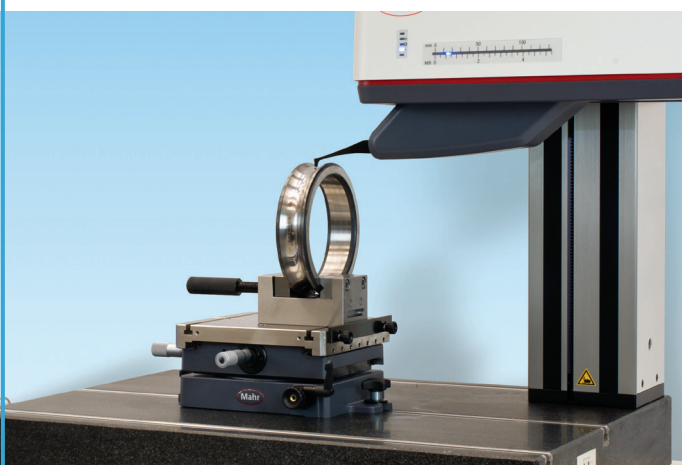


Measurements on wafer surfaces

In the semiconductor industry, precise, fast and reliable quality assurance is a must. This applies to the production of wafers. Fast, automatic inspection of selected areas on a wafer by white light interferometer or with the confocal mode can provide a perfect analysis of the structures on the wafer. Due to the flexibility of the CWM 100, finest structures can be analyzed interferometrically and for coarse structures or elements like dies, bonding structures etc. the confocal mode can do the job.

 WebCode 14892

Mechanical Engineering Industry



Measurements on ball rings

Ball races today need high-precision radii and minimum form deviation. Roughness measurement ensures smooth running and long service life with as little running noise as possible. MarSurf meets these requirements through user-friendly evaluation software and extremely quiet drive units.

 WebCode 14886

Medical Technology



Measurements on hip joints

Hip joint measurements need to be extremely accurate. Both the contour and roughness of the ball and/or socket affect the durability and performance of the joint.

 WebCode 14887

MarSurf. Handy and Precise for On-site Roughness Measurements





MOBILE ROUGHNESS MEASUREMENT DEVICES

▶ | Mahr has played a key role in ensuring the success of mobile roughness measurement devices. As early as the 1980s, Mahr was setting new standards with the M4P. The products have developed in line with changing production monitoring requirements. Today's devices meet the highest international standards. Mobile roughness measurement devices from Mahr are lightweight with a handy shape for flexible handling. They offer high-precision measurements in different positions and easy positioning using V-blocks, a practical shape and light weight. | ◀



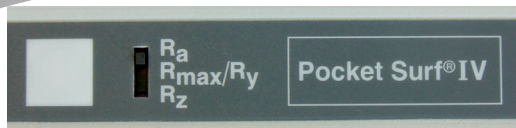
MarSurf. Mobile Surface Roughness Measuring Instruments

OVERVIEW

		PocketSurf IV	MarSurf PS 1	MarSurf M 300	MarSurf M 300 C
					
Page		15-6	15-10	15-12	15-13
Measuring principle		Skid probe system	Skid probe system		
Probe system		Piezoelectric	PHT probe range		
Probe		Stylus tip 5 or 10 µm, measuring force 15.0 mN	Inductive skidded probe, 2 µm stylus tip, measuring force ca. 0.7 mN		
Traversing length		ISO/ASME/DIN/MIL .075", .135", .195" 2 mm, 3.5 mm, 5 mm	ISO/JIS: 1.75 mm, 5.6 mm, 17.5 mm; automatic MOTIF: 1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm		
Measuring range		Ra - 6.35 µm/250 µin, Ry, Rmax, Rz - 25.3 µm/999 µin	350 µm, 180 µm, 90 µm (changes automatically)		
Profile resolution		0.01 µm/ 1 µin	32 nm, 16 nm, 8 nm (changes automatically)		
Evaluation lengths		.030", .090", .150"/.8, 2.4, 4 mm	1.25 mm, 4.0 mm, 12.5 mm		
Number of parameters available		3	31	33	33
Parameters	DIN / ISO	Ra, Ry, Rz, Rmax	Ra, Rq, Rz, Rmax, Rp, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R _{Pc} , R _{mr} , R _{Sm} , R _{sk} , CR, CF, CL, R, AR, Rx	Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R _{Pc} , R _{mr} , R _{Sm} , R _{sk} , R, AR, Rx, W, CR, CF, CL	Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R _{Pc} , R _{mr} , R _{Sm} , R _{sk} , R, AR, Rx, W, CR, CF, CL
	JIS	—	Ra, Rq, Ry (equiv. to Rz), RzJIS, tp (equiv. to R _{mr}), R _{Sm} , S	Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to R _{mr}), R _{Sm} , R _{sk} , S, R, AR, Rx, W, CR, CF, CL	Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to R _{mr}), R _{Sm} , R _{sk} , S, R, AR, Rx, W, CR, CF, CL
	ASME	Ra, Ry, Rz, Rmax	Rp, Rpm, R _{Pc} , R _{sk}	RpA, Rpm, R _{mr} , R _{Sm} , R _{sk}	RpA, Rpm, R _{mr} , R _{Sm} , R _{sk}
	MOTIF	—	R, AR, Rx, CR, CF, CL	R, AR, Rx, W, CR, CF, CL	R, AR, Rx, W, CR, CF, CL
Bluetooth		—	—	Yes	—
Large color display		—	—	Yes	Yes
Built-in printer		—	—	Yes	Yes
Integrated roughness standard for Standard probe PHT 6-350		—	Yes	Yes	—*
Cylindrical drive unit with hand-held Vee-block		—	—	—	Yes
Drive unit with transverse tracing (optional)		—	—	—	RD 18 C2
Internal memory		—	max. 15 Profiles max. 20000 Results	max. 30 Profiles max. 40000 Results	max. 30 Profiles max. 40000 Results
Software (optional)		MarCom, Explorer	MarCom, Explorer, MarSurf XR 20	Explorer, MarSurf XR 20	Explorer, MarSurf XR 20
Order no.	2 µm	2191800 10 µm radius	6910210	6910401	6910431
Order no.	5 µm	2191802 5 µm radius	6910214	6910411	—

*Scope of supply

Pocket Surf® IV the portable surface roughness gage



Nothing is easier than Pocket Surf IV's single button operation

A pocket-sized economically priced, completely portable instrument which performs traceable surface roughness measurements on a wide variety of surfaces; can be used confidently in production, on the shop floor and in the laboratory.



Built in measurement output



Economical and simple to replace battery

Features

- Solidly built, with a durable cast aluminum housing, to provide years of accurate, reliable surface finish gaging.
- Can be used to measure any one of four, switch selectable, parameters: R_a , R_{max}/R_y , R_z
- Then review any of the parameters after the measurement is complete
- Selectable traverse length 1, 3 or 5 cut-offs of 0.8 mm/0.030"
- Operates in any position – horizontal, vertical, and upside down
- Four switchable probe positions – axial (folded) or at 90°, 180° or 270°
- Even difficult-to-reach surfaces such as inside and outside diameters are accessible
- MarConnect data output for easy SPC-processing that is compatible with the most common data processing systems
- Easy-to-read LCD readout presents the measured roughness value, in microinches or micrometers, within half a second after the surface is traversed.
- Out-of-range (high or low) and "battery low" signals are also displayed
- Improved digital calibration process eliminate scandrivers and potentiometers to simplify and enhance the calibration process
- Improved battery life with easy to replace standard 9V battery

Technical Data

Dimensions	140 x 76 x 25 mm / 5.5" x 3" x 1"
Weight	435 g / 14 oz
Measuring Ranges	R_a 0.03 μm to 6.35 μm / 1 μinch to 250 μinch R_y 0.2 μm to 25.3 μm / 8 μinch to 999 μinch R_{max} 0.2 μm to 25.3 μm / 8 μinch to 999 μinch R_z 0.2 μm to 25.3 μm / 8 μinch to 999 μinch
Display Resolution	0.01 μm / 1 μin
Measurement Accuracy	Meets ASME-B46.1, ISO, DIN standards and MIL specifications
Digital Readout	LCD with, "Battery low" signal; "H" and "L" (measured values out-of-range)

Technical Data

Probing and Traverse Lengths

Parameters	Traverse Length (Nominal)	Evaluation Length	Number of Cutoffs/ Switch Position*
R_a/R_y	2.0 mm / .075"	0.8 mm / .030"	1
	3.5 mm / .135"	2.4 mm / .090"	3
$R_a/R_z/R_{max}$	5.0 mm / .195"	4.0 mm / .150"	5
Traverse Speed	5.08 mm / .2" per second		
Cutoff	0.8 mm / .030" ASME 2 RC-filter		
Probe Type	Piezoelectric		
Maximum Stylus Force	15.0 mN / 1500 mgf		
Power	Consumer-type alkaline battery, 9 Volt		
Battery Capacity	Approx. 2500 measurements, depending on frequency of use and output option		
Operating Temperature	10° to 45°C / 50° to 113° F		
Storage Temperature	-20° to 65°C / -4° to 149° F		

* Other cutoff/switch positions may be used



Pocket Surf Sets

Order no.			
2191800	EGH-1019	Probe, 90°, 10 μm radius, PMD-90101	Certified Specimen, incl. Test Certificate
2191802	EGH-1026	Probe, 90°, 5 μm radius, EMD-90101	Certified Specimen, incl. Test Certificate

A **Pocket Surf kit** is furnished complete in a fitted case, and includes a Pocket Surf unit with a General Purpose Probe** and a 3.2 μm/**125 μinch** (nominal) Reference Specimen**, 9 Volt battery and Riser Plate.

** Part Numbers listed in table above.

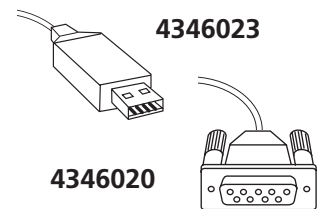


MarConnect - USB ready

The Pocket Surf IV® employs the MarConnect interface from Mahr. Marconnect simplifies data transmission to a PC and enables quick and universal assembly of a multiple measuring station.

	Order no.
Data Connection Cable USB (2 m) incl. MarCom Standard	16 EXu 4346023
Data Connection Cable Opto RS232C (2 m), with SUB-D jack 9-pin	16 EXr 4346020
Software MarCom Professional 4.0 Allows for up to 68 wired devices	4102552
Software MarCom Standard 3.1 Allows for 1 wired device	4102551

Accessories for Data Processing, see Dimensional Metrology Catalog Chapter 11



Pocket Surf® IV the portable surface roughness gage

Probes

General Purpose Probes

EGH-1019/EGH-1026

For most surface roughness applications.

EGH-1026

With a 90° conical diamond stylus, 5 μm/ .0002" radius*.

EGH-1019

With a 90° conical diamond stylus, 10 μm/ .0004" radius.

Transverse Chisel Probe

EGH-1020-W1

For gaging sharp edges or small O.D.'s where probe is aligned with (in 180° or closed position) to axis of traverse. 90° sapphire chisel, 10 μm/ .0004" radius.

Parallel Chisel Probe

EGH-1020-W2

For gaging sharp edges or small O.D.'s where probe is perpendicular (in 90°- or 270° position) to axis of traverse. 90° sapphire chisel, 10 μm/ .0004" radius. Also used with EAS-2421 Vee fixture for O.D.'s smaller than 6,35 mm / .25".

Small Bore Probe

EGH-1021/EGH-1027

For gaging small bores (3,2 mm/ .125" minimum I.D.) up to a depth of 19 mm/ .75".

EGH-1027

With a 90° conical diamond stylus, 5 μm/ .0002" radius*.

EGH-1021

With a 90° conical diamond stylus, 10 μm/ .0004" radius.

Groove Bottom Probe

EGH-1028

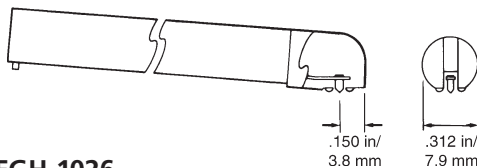
For measuring the bottom of grooves, recesses and small holes to depths of 6.35 mm/ .25".

Also used for short lands and shoulders.

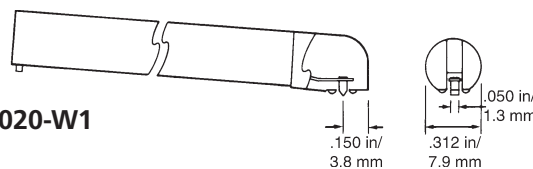
With 90° conical diamond stylus, 10 μm/ .0004" radius.

Note: Small Bore and Groove Bottom Probes can only be used in 180° position with the Pocket Surf unit supported in a height stand or other fixture.

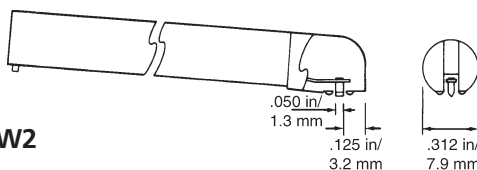
* Yellow dot at connector end signifies 5 μm/ .0002" radius.



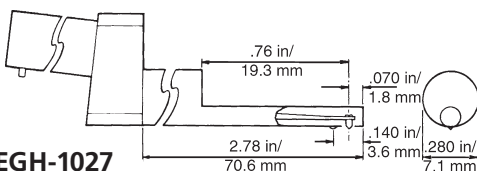
EGH-1019/EGH-1026



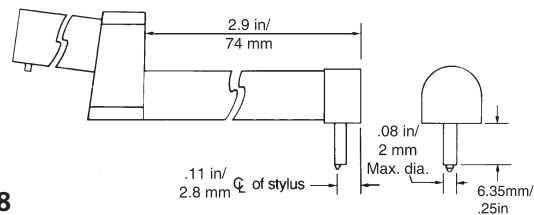
EGH-1020-W1



EGH-1020-W2

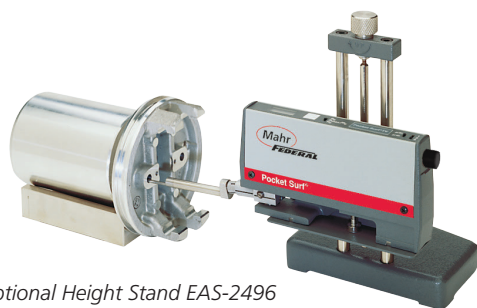


EGH-1021/EGH-1027



EGH-1028

Using the Groove Bottom Probe to check an "O" ring groove.



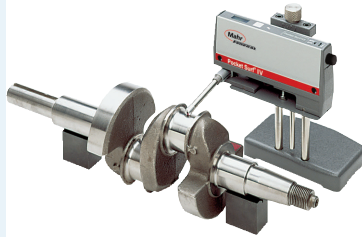
Shown with optional Height Stand EAS-2496

Applications and Accessories

Height Stand EAS-2496

A compact, convenient fixture with a bracket to hold the Pocket Surf gage. Designed for making measurements on a granite surface plate or on any suitable, flat working surface to a maximum height of about 111 mm / 4.375".

Order no. EAS-2496



Portable vee fixture EAS-2421

For measuring small parts with outside diameters from 3.1 mm / .125" to 25 mm / 1" for lengths of 25 mm / 1" minimum - includes PS-145 setting pin.

Order no. EAS-2421



Bore Adapter Kit EAS-2839

For timesaving hand-held measurement of bores without having to fix the workpiece. Accommodates all inside diameters from: 25 mm / 1" to 150 mm / 6"; depths from 25 mm / 1" to 60 mm / 2.4".

Order no. EAS-2839



Bottom Plate EAS-2584

For measuring cylindrical workpieces too short (less than 89 mm / 3.5" long) for the "closed" probe position; for workpieces with short O.D.'s from 6.35 mm / .25" (minimum 38 mm / 1.5" long).

Order no. EAS-2584



Vee-Adapter Kit EAS-2739

Attaches to bottom of Pocket Surf unit, permitting convenient, hand-held measurements of hard-to-reach cylindrical surfaces, such as crankshaft journals without having to fix the work piece. Suitable for parts with diameters from 5.0 mm / .19" to 125 mm / 5".

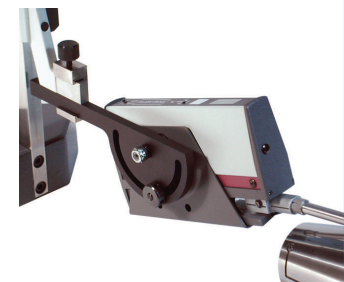
Order no. EAS-2739



EAS-3048 Mounting Bracket for use with height gages

For mounting the Pocket Surf to most standard height gages. The bracket includes a rectangular bar that is 11.5 mm x 6.35 mm (0.45" x 0.25") to fit the holder of the height gage. A swivel feature is included to permit the Pocket Surf to be set anywhere within a 360° rotation.

Order no. EAS-3048



Universal Stand EAS-2426

A heavy-duty stand equipped with an adjustable bracket to hold the Pocket Surf for measuring of workpieces, up to 213 mm / 8.37" tall.

Order no. EAS-2426



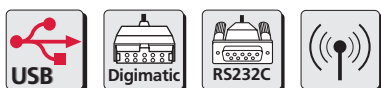
Height Stand with Swivel

A compact, convenient fixture with an adjustable bracket to hold the Pocket Surf, anywhere within a 360° rotation, for making measurements on a surface plate or on any suitable, flat working surface.

Order no. 2236687



Mobile Surface Roughness Measuring Instrument MarSurf PS 1 Absolute mobility



Applications

- On-site surface roughness measurement
- Measuring during the production process
- Universal use on processing machinery
- For incoming goods inspection



Features

- Small and lightweight; ideal as mobile surface roughness measuring instruments
- Large display
- Very simple to operate
- Start button is positioned on both the right and left side of the PS1; easy to operate regardless of whether you are left or right-handed but also practical for conducting upside down measurements
- Can be used horizontally, vertically, upside down etc.
- 31 parameters: offer the same range of functions as a laboratory instrument
- Parameters can be selected directly Ra, Rz
- Freely programmable, use the F1 button for direct access to any of your chosen parameters
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Integrated roughness standard for the standard pick-up PHT 6-350
- Dynamic calibration function
- Select standards (DIN-ISO/JIS/ASME/MOTIF)
- Automatic cutoff selection (patented) to ensure correct measuring results
- Individual sampling lengths and shortened cutoff can be selected
- Setting of unsymmetric intersection lines for peak count calculation
- Tolerance monitoring
- Lock settings and/or password protection
- Date and/or time of measurement
- Integrated memory to store ca. 20000 results and 15 profiles
- Data transmission via the USB interface to a PC
- Evaluation with PS1/M 300 Explorer Software, MarSurf XR 20 Evaluation Software or with a MarSurf XR 20
- MarConnect interface, to connect e.g. a PC via the MarCom Software
- Main free operation: the built-in rechargeable battery can be used for up to 500 measurements before being recharged
- Supplied with: MarSurf PS1 base unit, drive unit, standard pick-up (conforming to standards), built-in battery, roughness standard integrated into base unit, height adjustment accessory, pick-up protection, charger / mains adapter with 3 mains power adapters, carrying case with shoulder strap and belt loop, USB cable, Mahr calibration certificate, operating instructions

Technical Data

Unit of measurement		Metric / inch
Measuring principle		Stylus method
Pick-up		Inductive skidded pick-up, measuring force ca. 0.7 mN
Parameters	DIN / ISO	Ra, Rq, Rz, Rmax, Rp, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, RPC, Rmr, RSm, Rsk, CR, CF, CL, R, AR, Rx
	JIS	Ra, Rq, Ry (equiv. to Rz), RzJIS, tp (equiv. to Rmr), RSm, S
	ASME	Rp, Rpm, RPC, Rsk
	MOTIF	R, AR, Rx, CR, CF, CL
Languages		English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Czech, Polish, Russian, Japanese, Chinese, Korean, Turkish
Measuring range		350 μm , 180 μm , 90 μm (automatic switching)
Profile resolution		32 nm, 16 nm, 8 nm (automatic switching)
Filter*		Phase-correct profile filter (Gaussian filter) according to DIN EN ISO 11562, Special filter according to DIN EN ISO 13565-1, Is filter according to DIN EN ISO 3274 (can be disabled)
Cutoff l_c^*	mm (inch)	0.25 / 0.8 / 2.5 (0.010" / 0.030" / 0.100"); automatic
Traversing length L_t^*	mm (inch)	1.75 / 5.6 / 17.5 (0.069" / 0.22" / 0.69"); automatic
Traversing length (according to MOTIF)	mm (inch)	1 / 2 / 4 / 8 / 12 / 16 (0.040" / 0.080" / 0.160" / 0.320" / 0.480" / 0.640")
Short cutoff*		Selectable: 1 to 5
Evaluation length l_n^*	mm (inch)	1.25 / 4.0 / 12.5 (0.050", 0.15", 0.50")
Number n of sampling lengths*		Selectable: 1 to 5
Calibration function		Dynamic
Memory		max. 15 profiles, max. 20000 results
Additional functions		Lock settings / password protection, Date/Time
Dimensions	mm (inch)	140 × 50 × 70 (5.51" × 1.97" × 2.76")
Weight		400 g (0.88 lbs)
Rechargeable battery		Li-ion battery
Interfaces		USB, MarConnect (RS232/USB/Digimatic)
Long-range power supply		100 V to 264 V
Order no.	2 μm	6910210 (Set Includes pick-up No. 6111520 PHT 6-350 2 $\mu\text{m}/90^\circ$)
Order no.	5 μm	6910214 (Set Includes pick-up No. 6111526 PHT 6-350 5 $\mu\text{m}/90^\circ$)

* In accordance to ISO/JIS



MarSurf PS1 with height adjustment

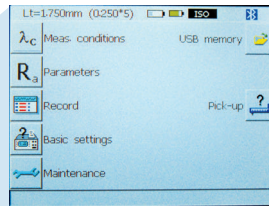


Underside of the MarSurf PS1

Mobile Surface Roughness Measuring Instrument MarSurf M 300 A step ahead



M 300



RD 18

Applications

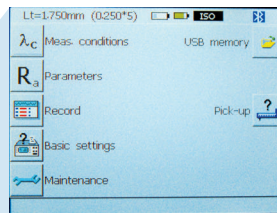
- On shafts, housing parts
- On large scale machines
- For large workpieces
- On milling and turning parts
- For use on grinding and honing components
- On the production line, or directly upon a machine. Ideal for rapid testing of the surface roughness of a workpiece in or on a machine
- A simple universal measuring station for checking surface roughness



Features

- Bluetooth wireless connection between the evaluation unit and drive unit (up to 4 m)
- Bright, illuminated color display
- Automatic selection of filter and traversing length conforming to standards
- Integrated thermal graphics printer of high print quality
- Print the R-profile via the thermal graphics printer
- Printed log either by pressing a button or automatically
- Data transfer of results and profiles via USB-interface to your PC
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Printing of R-profile (ISO/ASME/JIS), P-profile (MOTIF), material ratio curve, measuring record
- Measuring units ($\mu\text{m}/\mu\text{inch}$) and standards (ISO/JIS/ASME/MOTIF) are selectable
- Tolerance monitoring
- Integrated memory for the results of up to 40000 measurements and 30 profiles
- Setting of unsymmetric intersection lines for peak count calculation
- Individual sampling lengths and short cutoff can be selected
- Key pad lock and/or password protection for instrument settings
- Built-in rechargeable battery with power management
- Integrated roughness standard for the standard pick-up PHT 6-350
- Dynamic calibration function
- Date and/or time of measurement
- Software MarSurf PS1/M 300 Explorer for recording measurements (option)
- Supplied with: Evaluation unit M 300, drive unit RD 18 with integrated roughness standard, standard pick-up PHT 6-350 (conforming to standards), charger / mains adapter with 3 mains power adapters, height adjustment accessory, pick-up protection, pick-up protection with prismatic underside, end face vee-block, 2 x USB cables, 1 roll of thermal paper, shoulder strap, carrying case, Mahr calibration certificate, operating instructions

Mobile Surface Roughness Measuring Instrument MarSurf M 300 C A step ahead



Applications

- On shafts, housing parts
- On large scale machines
- For large workpieces
- On milling and turning parts
- For use on grinding and honing components
- On the production line, or directly upon a machine. Ideal for rapid testing of the surface roughness of a workpiece in or on a machine
- A simple universal measuring station for checking surface roughness

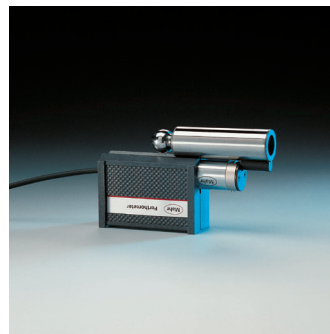


M 300 C

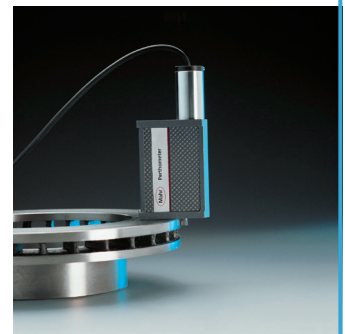
RD 18 C + Handheld Vee block
(detachable)



Example: Measurement with height adjustment



Example: Upside down measurement



Example: Measurement on an end face vee

Features

- Bright, illuminated color display
- Automatic selection of filter and traversing length conforming to standards
- Integrated thermal graphics printer of high print quality
- Easy to use due to the large color display and the operator guidance
- Printing of R-profiles with the thermo printer
- Printed log either by pressing a button or automatically
- Data transfer of results and profiles via USB-interface to your PC
- Evaluation of most common parameters conforming to standards and in accordance to ISO/JIS as well as characteristic curves, parameter lists (e.g. material ratio curve)
- Printing of R-profile (ISO/ASME/JIS), P-profile (MOTIF), material ratio curve, measuring record
- Measuring units ($\mu\text{m}/\mu\text{inch}$) and standards (ISO/JIS/ASME/MOTIF) are selectable
- Integrated memory for the results of up to 40000 measurements and 30 profiles
- Tolerance monitoring
- Setting of unsymmetric intersection lines for peak count calculation
- Cylindrical drive unit with handheld vee block and PHT pick-up protection
- Individual sampling lengths and short cutoff can be selected
- Lock instrument settings
- Date and/or time of measurement
- Can be expanded to be an stationary measuring station
- Software MarSurf PS1/M 300 Explorer for recording measurements (option)
- Supplied with: Evaluation unit M 300 C, cylindrical drive unit RD 18 C incl. 1.8 m data connection cable, handheld vee block with height adjustable feet, standard pick-up PHT 6-350/2 μm (conforming to standards), roughness standard PRN 10 with Mahr calibration certificate, 1 roll of thermal paper, pick-up protection with prismatic underside, dia. 8 mm mounting clamp for drive unit, charger / mains adapter with 3 mains power adapters, 1 x USB cable (for connection to a PC), shoulder strap, carrying case, operating instructions

Mobile Surface Roughness Measuring Instrument MarSurf M 300 / M 300 C

Technical Data

Measuring principle		Stylus method
Traversing speed	mm (inch)	0.5 mm/s (0.02"/s)
Measuring range		350 µm (0.014")
Profile resolution		90 µm, 180 µm, 350 µm (automatic switching) 8 nm, 16 nm, 32 nm (automatic switching)
Filter		Gaussian filter, Ls-Filter (switchable)
Cutoff	mm (inch)	0,25, 0,8, 2,5 (0.010", 0.032", 0.100")
Short Cutoff		wählbar
Traversing lengths as per DIN / ISO / ASME / JIS	mm (inch)	1,75, 5,6, 17,5 (0.070", 0.2242, 0.700")
Traversing lengths as per EN ISO 12085 (MOTIF)	mm	1, 2, 4, 8, 12, 16
Evaluation lengths	mm (inch)	1,25, 4, 12,5 (0.05", 0.16", 0.5")
Number of sampling lengths selectable:		1-5
Parameters	DIN / ISO:	Ra, Rq, Rz, Rmax, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Vo, Rt, R3z, R _{Pc} , R _{mr} , R _{Sm} , R _{Sk} , R, AR, Rx, W, CR, CF, CL
	JIS:	Ra, Rq, Ry (equiv. to Rz), RzJIS, Rp, Rv, Rpk, Rk, Rvk, Mr1, Mr2, A1, A2, Rt, tp (equiv. to R _{mr}), R _{Sm} , R _{Sk} , S, R, AR, Rx, W, CR, CF, CL
	ASME:	R _{pA} , R _{pm} , R _{mr} , R _{Sm} , R _{Sk}
	MOTIF:	R, AR, Rx, W, CR, CF, CL
Vertical scale		Automatic/selectable
Horizontal scale		Depending on the cutoff
Record contents		R -profile, MRK, P-profile (MOTIF), results
Printing		Automatic/manual Record with time
Surface hardness		Ideal for surface hardness >50 Shore
Calibration function		Dynamic
Memory		Integrated memory For the storage up to 40000 measurements and up to 30 profiles µm/µinch selectable
Measuring units		English, German, French, Italian, Spanish, Portuguese, Dutch, Swedish, Czech, Polish, Russian, Japanese, Chinese, Korean, Turkish
Languages selectable:		Yes
Blocking instrument settings		Yes
Password protection		Yes
LCD		High resolution color display, 3.5", 320 x 240 pixel
Printer		Thermal printer, 384 points/horizontal line, 20 characters/line
Printing speed		ca. 6 lines/second corresponds to approx. 25 mm/s (1"/s)
Thermal paper		Dia. 40.0 mm-1.0 mm, width 57.5 mm-0.5 mm, coated
Interface		USB, MarConnect
Power supply		NiMH battery, capacity: approx. 500 measurements (depending on the number and length of record printouts), plug-in power pack with three mains plugs, for input voltages from 90 V to 264 V
Power management		Yes
Connections		Drive unit, power pack, USB, MarConnect
Protection class	M 300 / M 300 C RD 18 / RD 18 C	IP 42 IP 40
Temperature range for storage		-15°C to +55°C (5°F to 131°F)
Temperature range for operation		+5°C to +40°C (41°F to 104°F)
Relative humidity		30 % to 85 %
Dimensions (L x W x H)	M 300 / M 300 C	190 x 140 x 75 mm (7.5" x 5.5" x 3")
Dimensions (L x W x H)	RD 18	130 x 70 x 50 mm (5.1" x 2.7" x 2")
Dimensions (L x dia.)	RD 18 C	139 x 26 mm (5.5" x 1")
Dimensions (L x W x H)	RD 18 C*	82 x 34 x 59 mm (3.2" x 1.3" x 2.3")
Weight	M 300 / M 300 C	ca. 1 kg
	RD 18	ca. 300 g
	RD 18 C	ca. 165 g
	RD 18 C*	ca. 55 g
Order no.	M 300 Set 2 µm	6910401
Order no.	M 300 Set 5 µm	6910411
Order no.	M 300 C Set 2 µm	6910431

* Handheld Vee block

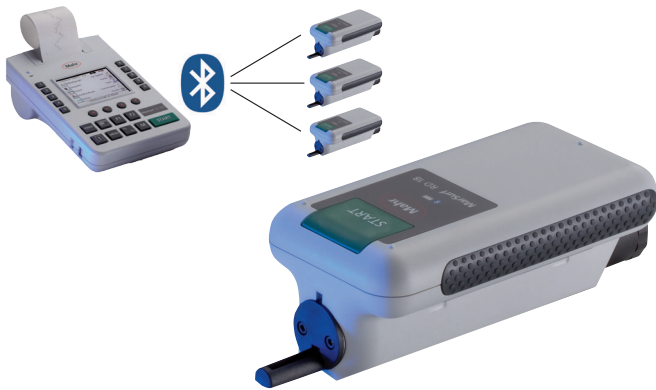
Mobile Surface Roughness Measuring Instrument MarSurf M 300

Drive Unit MarSurf RD 18

Bluetooth Technology

Unique: Cable-free connection between evaluation unit and drive unit!

A further advantage is the connection of several drive units to only one evaluation unit.



Features

- The well-proven PHT-skid probes are implemented in the drive unit.
- Can be connected via a cable
- Supplied with: Drive unit RD 18 with integrated roughness standard

Technical Data

Tracing direction	Longitudinal
Traversing length as per DIN/ISO	adjustable on M 300
	1.75 mm, 5.6 mm, 17.5 mm (0.07", 0.22", 0.7")
as per EN ISO 12085	1 mm, 2 mm, 4 mm, 8 mm, 12 mm, 16 mm
Traverse speed	0.5 mm/s
Dimensions (w/o pick-up protection)	dia. 24 mm, L = 112 mm
Bluetooth range	up to 4 m
Order no.	6910403

Drive Unit MarSurf RD 18 C2 for transverse tracing



Features

- During the manufacturing process, surface measurements of work pieces usually require special tools to find the right solution for a particular task; e.g. transverse scanning on a crank or camshafts, or measuring bearings. For such tasks the drive unit RD 18 C2 is available for transverse scanning.
- The well-proven PHT-skid probes are implemented in the drive unit.
- The drive unit RD 18 C2 is attached in the same way as the RD 18. By being able to use both types of drive units the range of application offered by the mobile MarSurf M 300 C is broadened.
- Supplied with: Drive unit RD 18 C2, pick-up protection with prismatic underside, pick-up protection and a screwdriver

Technical Data

Tracing direction	Transverse
Traversing length as per DIN/ISO	adjustable on M 300
	1.75 mm, 5.6 mm (0.07", 0.22")
as per EN ISO 12085	1 mm, 2 mm, 4 mm
Traverse speed	0.1 mm/s and 0.5 mm/s
Dimensions (w/o pick-up protection)	dia. 24 mm, L = 142 mm
Order no. RD 18 C2	6910426
Order no. chuck RD 18 C2 for Ø 5 mm to Ø 80 mm	6850738

Optional probes for MarSurf PS1 / M 300 / M 300 C

Probes for various measuring tasks

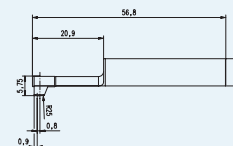
The P-probes are characterized by special construction features:

- Stylus tip geometry as per EN ISO 3274, standard 2 µm/90°
- Measuring force of approx. 0.7 mN (as per EN ISO 3274)
- Reliable inductive converter
- Robust, rigid housing
- Self-aligning, elastic bearings
- Reliable plug and socket connections

Pick-up PHT 6-350 (standard probe)



System Single-skid pick-up with spherical skid
 Skid radius in traversing direction 25 mm (.984"), at right angles 2.9 mm (.114")
 Contact point 0.8 mm (.0315") in front of the stylus
 Meas. range 350 µm (0.014")
 Specification for plane surfaces, bores with a dia. larger than 6 mm (.236") and a max. depth of 17 mm (.669"), grooves with a width larger than 3 mm (.118"); min. workpiece length = traversing length + 1 mm (.0394")



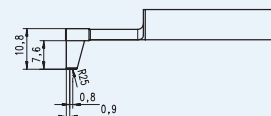
Order no. 6111520* probe with 2 µm/90° tip, (Black Tip)
Order no. 6111526* probe with 5 µm/90° tip, (Blue Tip)

* Included in scope of supply with selected Order No.

Pick-up PHT 11-100

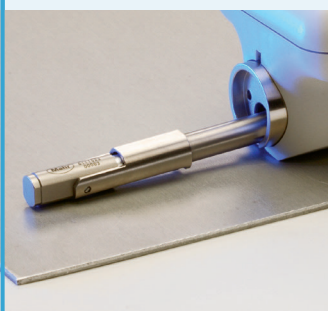


System Single-skid pick-up with spherical skid
 Skid radius in traversing direction 25 mm (.984"), at right angles 2.9 mm (.114")
 Contact point 0.8 mm (.0315") in front of the stylus
 Meas. range 100 µm (.00394")
 Specification for plane surfaces, bores with a dia. larger than 11 mm (.433") and a max. depth of 14 mm (.551"), grooves with a width larger than 2.5 mm (.098")

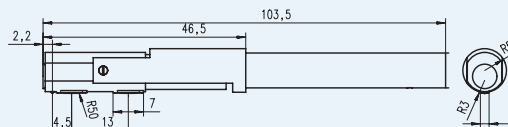


Order no. 6111524

Pick-up PT 150

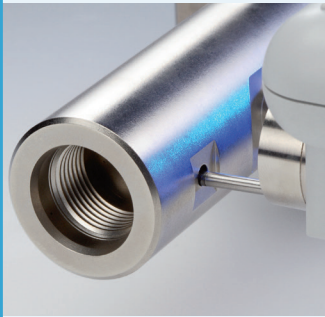


System Dual-skid pick-up with spherical skid
 Skid radius in traversing direction 50 mm (1.969"), at right angles 3 mm (.118")
 Contact point 4.5 mm (.177") in front of the stylus
 Meas. range 150 µm (.006")
 Specification for measurements on metal sheets and roller surfaces according to DIN EN 10049 (SEP). min. workpiece length = tracing length + 5 mm (.197")



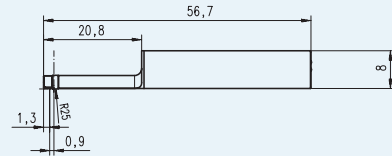
Order no. 6111523

Pick-up PHT 3-350

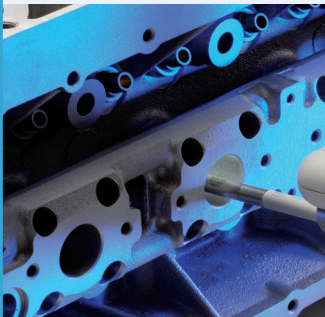


System Single-skid pick-up with spherical skid
 Skid radius in traversing direction 25 mm (.984"),
 at right angles 1.45 mm (.0571")
 Contact point 0.9 mm (.0354") in front of the stylus
 Meas. range 350 μm (0.014")
 Specification for bores with a dia. larger than 3 mm (.118") and
 a max. depth of 17 mm (.669 ")
 min. workpiece length =
 traversing length + 1 mm (.0394")

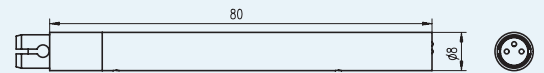
Order no. 6111521



Pick-up extension PHT (80 mm) for P probes



Order no. 6850540

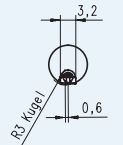
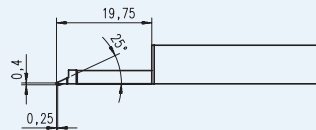


Pick-up PHTF 0.5-100

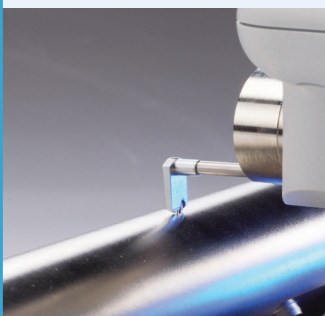


System Single-skid pick-up with spherical skid
 Skid radius in traversing direction 25 mm (.984"),
 at right angles 1.45 mm (.0571")
 Contact point 0.6 mm (.0236") at the side the stylus
 Meas. range 100 μm (.00394")
 Specification e.g. for gear tooth flanks with a modulus larger than 0.8
 Calibration via Geometric standard PGN

Order no. 6111522

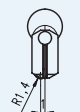
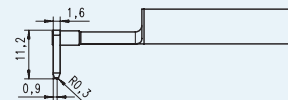


Pick-up PHTR-100



System Single-skid pick-up with lateral, spherical skid
 Skid radius in traversing direction 0.3 mm (.012")
 stylus radius 2 μm (.0008"), 90°
 Specification for measurements on concave and convex surfaces
 Calibration via Geometric standard PGN

Order no. 6111525



MarSurf PS 1 / M 300 Accessories

Transverse tracing adapter with vee-block holder for PS 1 / RD 18

For hand-held transverse tracing of cylindrical measuring objects, a pick-up adapter and a vee-block can be mounted to the MarSurf PS1 / RD 18 unit. According to the diameter of the measuring object, two different vee-blocks are available:

- Vee-block with 120° angle of Vee, for diameters from 5 up to 50 mm (0.2" to 2")
- Vee-block with 150° angle of Vee, for diameters from 50 up to 130 mm (2" to 5.1").



Order no.

Adapter for transverse tracing

6850541

Vee-block holder

6850542

End face vee-block for PS 1 / RD 18*

Suitable for measurements on flat end face of cylindrical and planar components.

* optional



Order no.

End face vee-block

6910203

Pick-up protection for PS1 / RD 18 / RD 18 C

Order no.

Pick-up protection, steel

6850716

Pick-up protection with header vee-block, steel

6850715

Pick-up protection, plastic*

7028532

Pick-up protection header vee-block, plastic**

7028530

* With PS 1 and M 300 Set included in the scope of supply

** With M 300 and M 300 C Set included in the scope of supply



Illustration: 7028532

MarSurf PS1 / M 300 / M 300 C Accessories

Mount for measuring stand ST

Accessories for measuring stands (these are not included in the measuring stands scope of supply):

Mount for MarSurf PS1 / RD 18

The drive unit RD 18 can in the mount be pivoted and locked in any position ($\pm 15^\circ$)

Order no. 6910201

Mount for MarSurf RD 18 C

The drive unit RD 18C can in the mount be pivoted and locked in any position ($\pm 15^\circ$)

Order no. 6851304

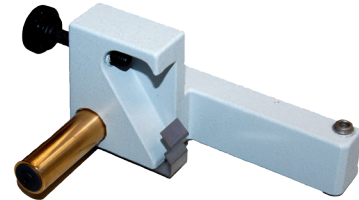


Illustration: 6910201

Measuring stand ST

Measuring stand ST-D

Height adjustment	0 to 300 mm, with a hand wheel
Dimensions (L x W x H)	175 x 190 x 385 mm
Weight	ca. 3 kg

Order no. 6710803

Measuring stand ST-F

Grantee plate. The required measuring height can be adjusted with a hand wheel for convenient and accurate positioning of the drive unit.

Height adjustment	0 to 300 mm, with a hand wheel
Dimensions (L x W x H)	400 x 300 x 415 mm
Weight	ca. 35 kg

Order no. 6710806

Measuring stand ST-G

Grantee plate with a 10 mm (.39 in) T-slot for mounting work pieces. The required measuring height can be adjusted with a hand wheel for convenient and accurate positioning of the drive unit.

Height adjustment	0 to 300 mm, with a hand wheel
Dimensions (L x W x H)	500 x 300 x 415 mm
Weight	ca. 35 kg

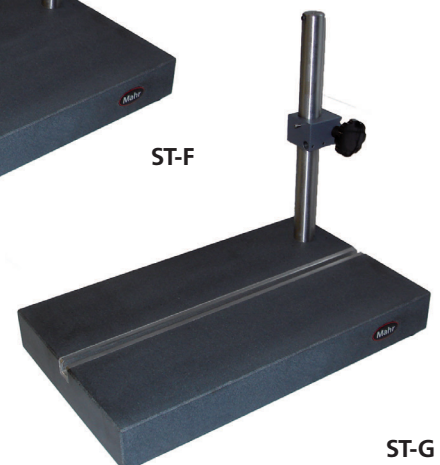
Order no. 6710807



ST-D



ST-F

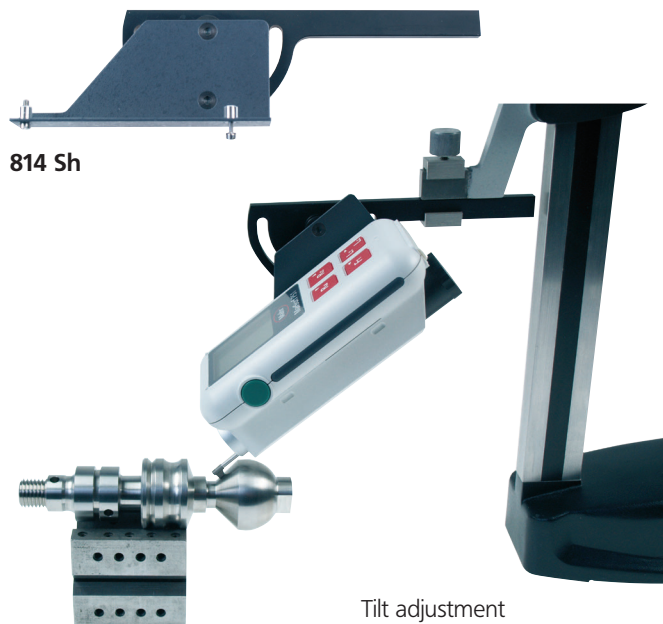


ST-G

MarSurf PS1 / M 300 Accessories

Mounting bracket for Digimar 814 SR

	Order no.
814 Sh Adjustable mounting bracket to connect the PS 1 / RD 18 to a 814 SR	2247086



For additional Product Information and Technical Data regarding the Digimar 814 SR for MarSurf PS 1 / RD 18, please refer to page 2-19



Efficient Application Aids for Manufacturing

MarSurf MDR-2



Tough manufacturing environments require quick and easy roughness measurements. The shop floor is particularly demanding on measuring instruments. **Application aids** from **Mahr** are the perfect solution.

They work together with the evaluation units of the M 300 series. A calibration / resting station is already included in the scope of delivery.

- Special design allows precise, easy positioning of measuring instrument
- Easy to use even without specialist metrological knowledge
- Drive unit protected from environmental influences that might disrupt the measurement
- Probe protection, i.e. probe is only extended during measurement
- Surface protection material ensures measurement leaves no marks on the workpiece

MarSurf MBF-2

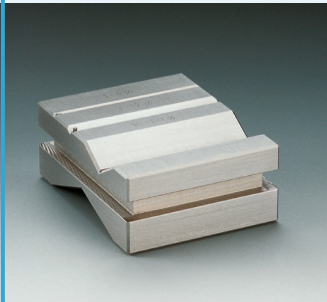


MarSurf MCB-7



MarSurf PS 1 / M 300 / M 300 C Accessories

Vee-block PP



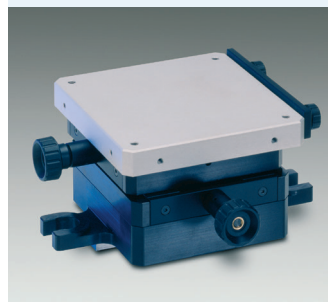
With four different prisms for mounting axis-symmetrical workpieces with diameters from 1 mm to 160 mm (.0394" to 6.30").

Dimensions (L x W x H)
80 x 100 x 40 mm
3.91" x 3.15" x 1.58"
Weight 1.5 kg / 3.31 lb

Including damping springs for holding light workpieces in the prism.

Order no. 6710401

XY table CT

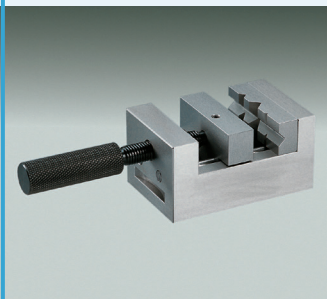


For mounting and aligning workpieces. Can be adjusted in two coordinates by 15 mm (.591").

Table surface 120 x 120 mm
Table surface 4.728" x 4.728"
with two brackets.

Order no. 6710529

Parallel vice PPS



For mounting rectangular and cylindrical workpieces

Jaw width 70 mm / 2.76"
Jaw height 25 mm / .984"
Span 40 mm / 1.58"
Total height 58 mm / 2.28"
Weight 2 kg / 4.41 lb

Order no. 6710604

Mini Precision Vise 109 PS as set



With mini precision vises. Depending on the version with prism jaws, carrier plates, stands and mini dividing attachment. Included in a plastic case

Width of jaws 15 / 25 / 35 mm

Order no. 4246819

Roughness standard PRN 10

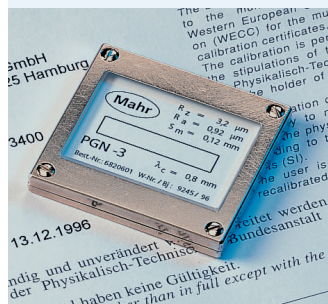


With Mahr calibration certificate. Roughness standard with turned profile, chromed. Profile depth ca. 10 μm (.394 μinch), for checking the roughness measuring station.

Order no. 6820420*

* With the M 300 C Set this is included in the scope of supply.

Geometric Standard PGN



Surface standard with sinusoidal groove profile for dynamic monitoring of the roughness measuring station. Ra, Rz, Rmax. Optical flat. The following versions are available:

		Order no.
PGN 1	Profile depth ca. 1.5 μm (60 μinch), groove distance ca. 0.10 mm (0.0039")	6820602
PGN 3	Profile depth ca. 3 μm (120 μinch), groove distance ca. 0.12 mm (0.0047")	6820601
PGN 10	Profile depth ca. 10 μm (394 μinch), groove distance ca. 0.20 mm (0.0079")	6820605

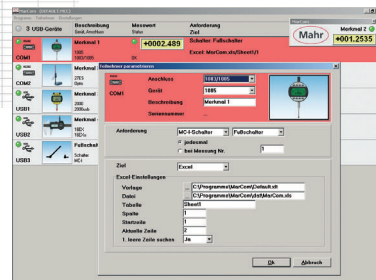
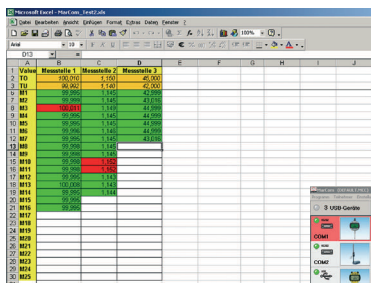
Mahr-calibration certificate for PGN **9027715**
DKD (German Calibration Service) calibration certificate for PGN **6980102**

MarSurf PS 1 / M 300 / M 300 C Accessories

MarCom Software for PS 1 / M 300 / M 300 C

Software MarCom Professional

- Measured values can be directly transferred into MS Excel (from version 97) or into a text file or key code
- The measured values from each instrument can be sent to a different column, table or folder in Excel
- Data transmission via USB and/or 2 serial COM interfaces
- Flexible and comfortable data transmission: you can either press the "Data" button on the measuring instrument or on the data cable; via a computer keyboard, timer; or by activating a foot switch connected to an USB interface



Software MarCom Standard (included with the USB data cable)

Features and system requirements are identical to MarCom Professional, except that it only has one USB and one serial COM interface.

Order no.

Software MarCom Professional

4102552

Software MarCom Standard

4102551

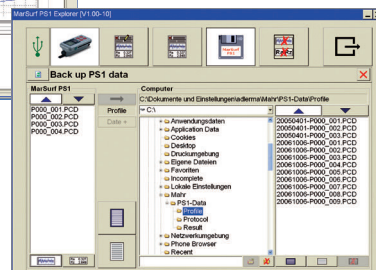
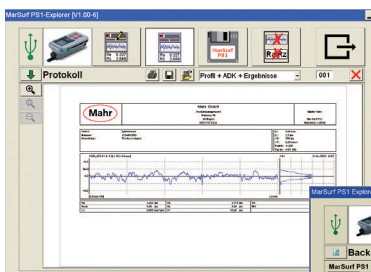
Data Cable 16 EXu incl. MarCom Standard

4102357

Software MarSurf PS 1 / M 300 Explorer

- The software can be used to secure and document your measuring results and profiles (simply use Drag & Drop)
- The stored data can for example, be printed out on a A4 sheet or in any other format
- The measuring data can be displayed in different forms: profile and results, results, profile + MRC + results, statistics, and much more

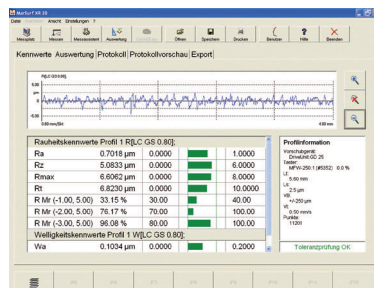
Order no. 6910205



Evaluation Software MarSurf XR 20

- An easy way to evaluate and document data based on MarWin
- Evaluation and documentation of the results can be conducted independently and away from the measuring station
- Filing including documentation is made simple
- Workstation version available

Order no. 6299054



MarSurf. Surface Metrology



MOBILE ROUGHNESS MEASUREMENT

MOBILE AND STATIONARY SURFACE MEASUREMENT FOR ROUGHNESS AND CONTOUR



MarSurf M 400. The Best of the "Mobiles"

Easy. Fast. Innovative. With skidless tracing and automatic zero setting.

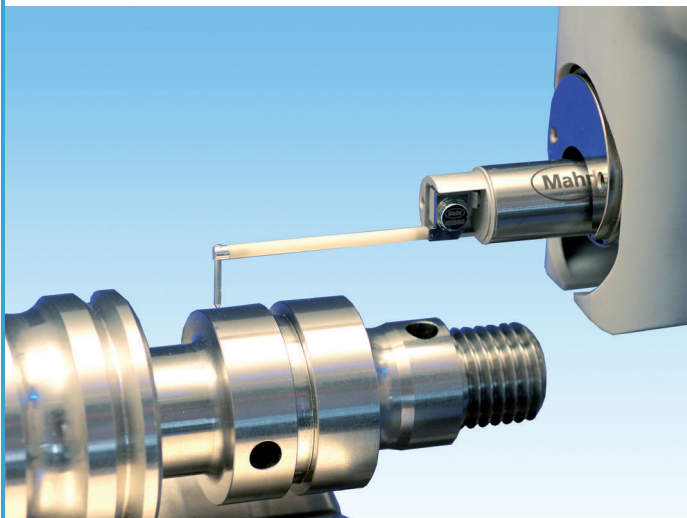


Measuring in production

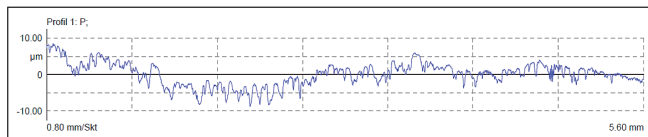
Description

The need for high quality mobile surface metrology is increasing. In many cases, a skidded measurement is no longer sufficient and skidless tracing is required instead. Especially when determining parameters from the unfiltered P profile or waviness parameters, a skidless measurement is absolutely necessary. MarSurf M 400 fulfills these characteristics completely and additionally has the advantage of easy operation even for complex measuring tasks.

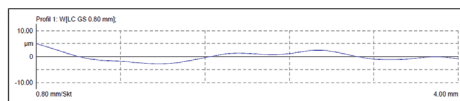
The automatic zero setting option spares the user complicated manual zero setting. After pressing the start button, zero setting and subsequent measurement are started right away.



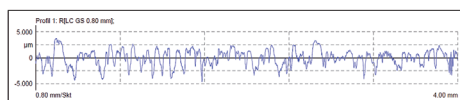
P profiles



W profiles

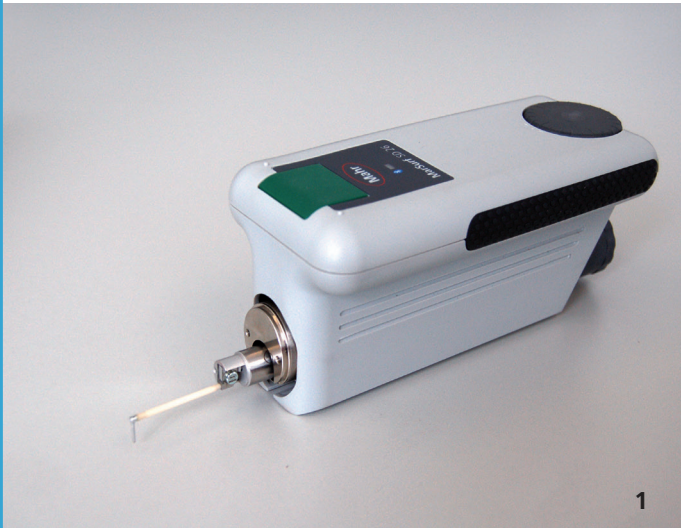


R profiles

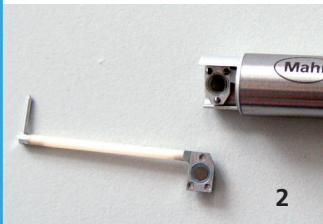


MarSurf M 400. The Best of the "Mobiles"

Drive Unit SD 26 and Probe System BFW-250



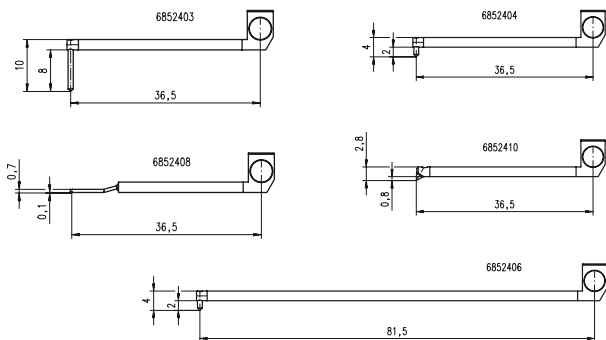
1



2



3



4

The possibility to expand the mobile surface measuring unit to a small stationary work station can be easily and quickly realized by adding only a few components from the line of MarSurf accessories.

Fast and easy alignment of the drive unit relative to the testpiece thanks to the inclination adjustment option.

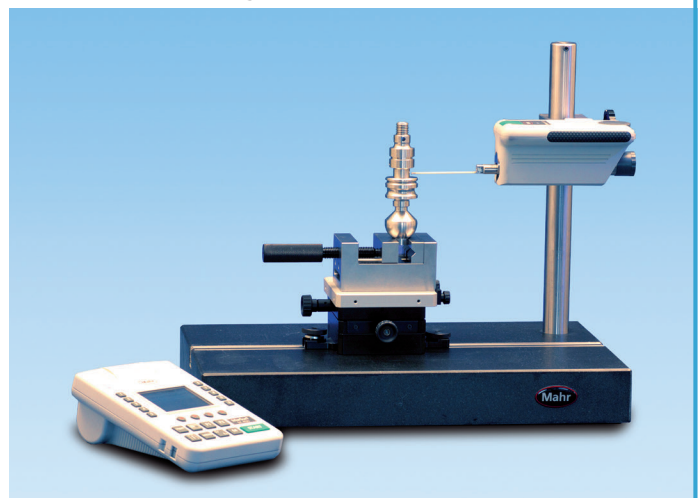
The MarSurf M 400 enables the evaluation of parameters from the P, W and R profiles.

Features

- **Skidless tracing** with high precision probe system (1)
- **Fast probe arm change** due to magnetic probe arm holder (2, 3, 4)
- **Protection from damage**
- **Only a few seconds of setting time required** due to motorized height adjustment of the drive unit with automatic zero setting
- **Flexible handling** with cable-free *Bluetooth* connection
- **Concise, clear and easy** due to brilliant color display for the depiction of results and operator guidance
- **Mobile use** due to operation with AC adapter or built-in battery
- **Internationally up to date** with all common parameters as per ISO, JIS, ASME, many integrated languages
- **Documentation with quality** with integrated thermal printer for printout of profile and results
- **Standardized measuring point** density despite increased measuring speed

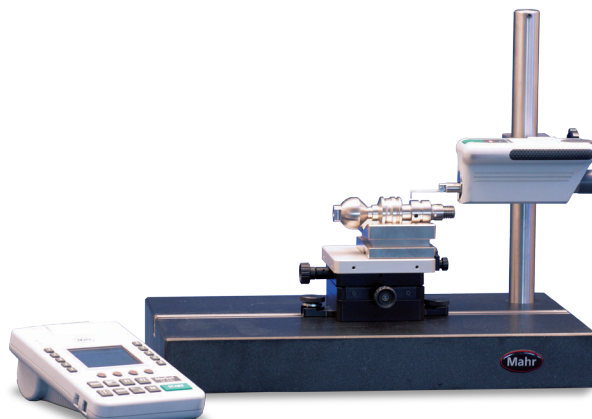


Upside down measurement with vee-block
Automatic zero setting of the BFW-250



MarSurf measuring station with measuring stand ST-G

MarSurf M 400 The Best of the "Mobiles"



Scope of Delivery

- Evaluation unit MarSurf M 400
- Drive unit MarSurf SD 26 incl. probe system BFW-250
- Standard probe arm (6852403)
- 1 thermo paper roll
- Wide-range AC adapter mit 3 adapters
- 2 x USB cables (to connect to PC and for use with cable)
- Operating instructions

All items are delivered in a practical carrying case.

MarSurf M 400 set:

Order no. 6910404

Technical Data

Measuring principle	Tactile stylus method
Probes	BFW skidless probe system
Measuring range	+/-250 μm (to +/-750 μm for triple probe arm length)
Profile resolution	Measuring range $\pm 250 \mu\text{m}$: 8 nm Measuring range $\pm 25 \mu\text{m}$: 0.8 nm
Filter as per ISO/JIS	Gaussian filter as per ISO 11562 Filter as per ISO 13565
Cutoff l_c as per ISO/JIS	0.25 mm, 0.8 mm, 2.5 mm, automatic, variable
Number n of individual measuring paths as per ISO/JIS	1-5
Probe speed	0.2 mm/s; 1.0 mm/s
Measuring force	0.7 mN
Parameters	Over 50 parameters for R-, P-, W-profiles according to current standards ISO/JIS or motif (ISO 12085)

Applications

Mechanical engineering

Bearings, shafts, racks, valves

Automotive industry

Steering, brake systems, transmissions, crankshafts, camshafts, cylinder heads, cylinder blocks, turbochargers

Steel industry

Measurement of sheet metal surfaces
Measurement of roller surfaces

Medical industry

Roughness depth measurement of hip and knee prosthetics

Aerospace

Turbine components

Accessories

Measuring stands

- ST-D, ST-F and ST-G
- Mount on measuring stand

Further accessories

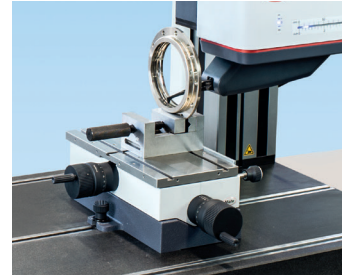
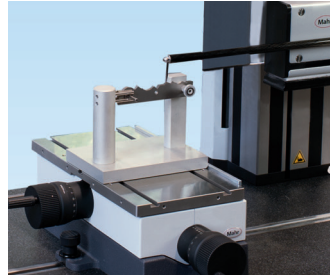
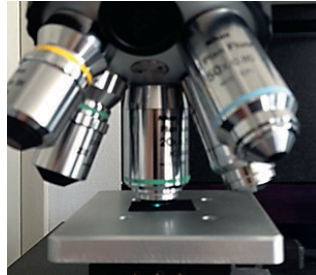
XY table CT 120, parallel vice, prism block
Diverse probe arms for the probe system BFW



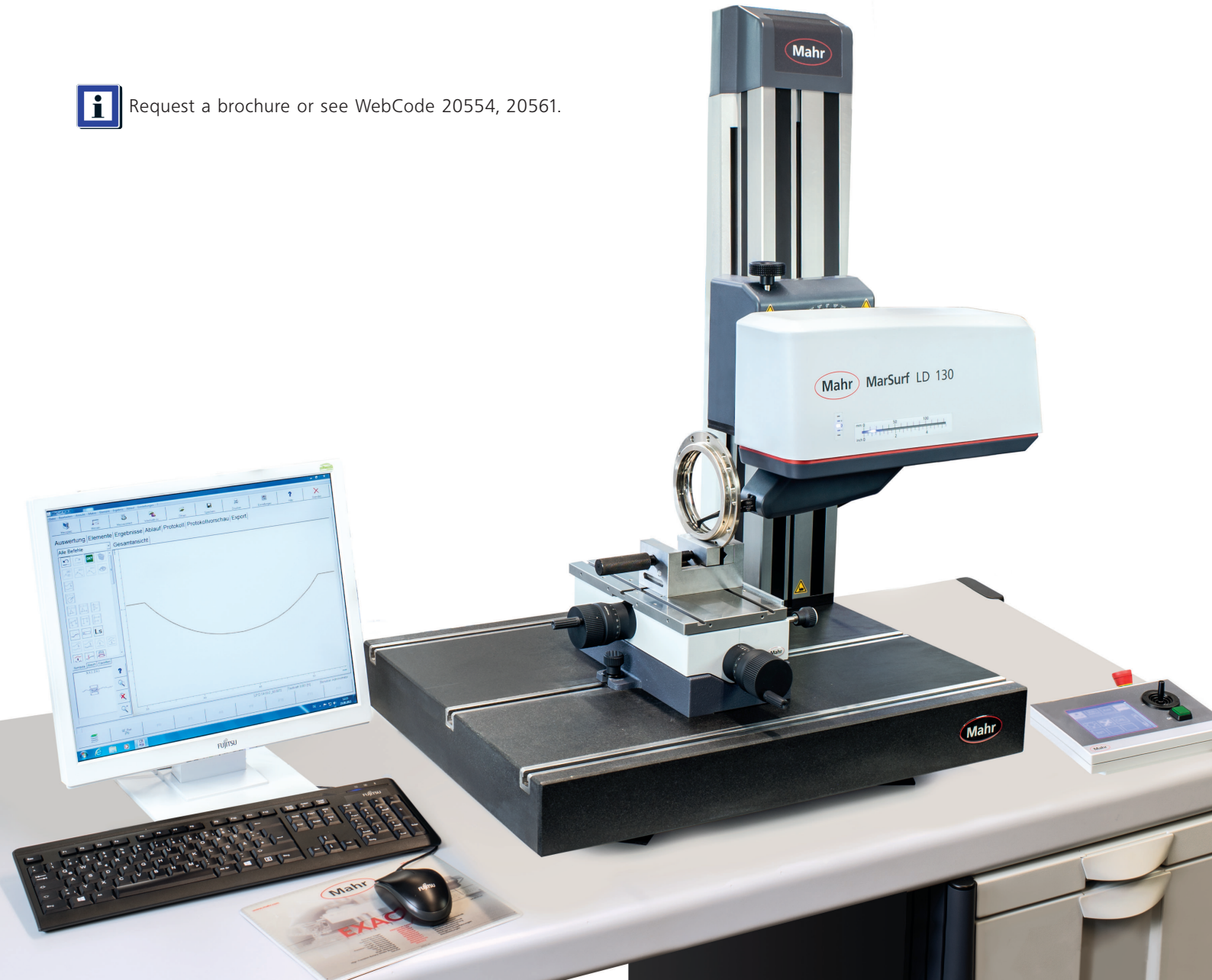
MarSurf. PC-based Stationary Surface Measuring Stations

VERSATILE, HIGH-PERFORMANCE UNITS FOR INSPECTION ROOM AND LABORATORY

▶ | This equipment facilitates manual and automated operation. By means of different software components and connection of various drive units measurement of roughness, contour and topography is possible. | ◀



Request a brochure or see WebCode 20554, 20561.



MarSurf XR 1



Description

MarSurf XR 1. The right unit to inexpensively enter into the world of convenient surface metrology.

Whether in the measuring room or in production, the PC-based unit provides all common parameters and profiles of international standards. MarSurf XR 1 at Mahr means future-oriented roughness software.

Features

- Over 80 parameters for R, P, W profiles according to current standards, ISO/JIS or MOTIF (ISO 12085) selectable
- Band pass filter Ls according to current standards, Ls can also be switched off or freely varied
- Extensive measuring records
- Quick and Easy measuring programs can be quickly created in a user-guided function. Automatic function for the selection of cutoff and measuring path according to standards (patented)
- Different calibration methods are supported (static and dynamic) with specification of parameters Ra or Rz
- Selectable maintenance and calibration intervals
- Many measuring station configurations are possible for each individual application case
- System flexibility due to different options
- Different user levels protect from erroneous use of the unit and ensure that unauthorized users cannot operate the device

Software

General software options

- Option - Dominant waviness (Wdc) for MarWin
- Option - Parameters ISO 13565-3
- Option - QS-STAT / QS-STAT Plus
- Option - Profile processing
- Option - User-defined parameters
- Option - Contour 1 for MarSurf XR 1 / XR 20 (in connection with drive unit MarSurf SD 26)
- All options on one MLK (Mahr License Key)

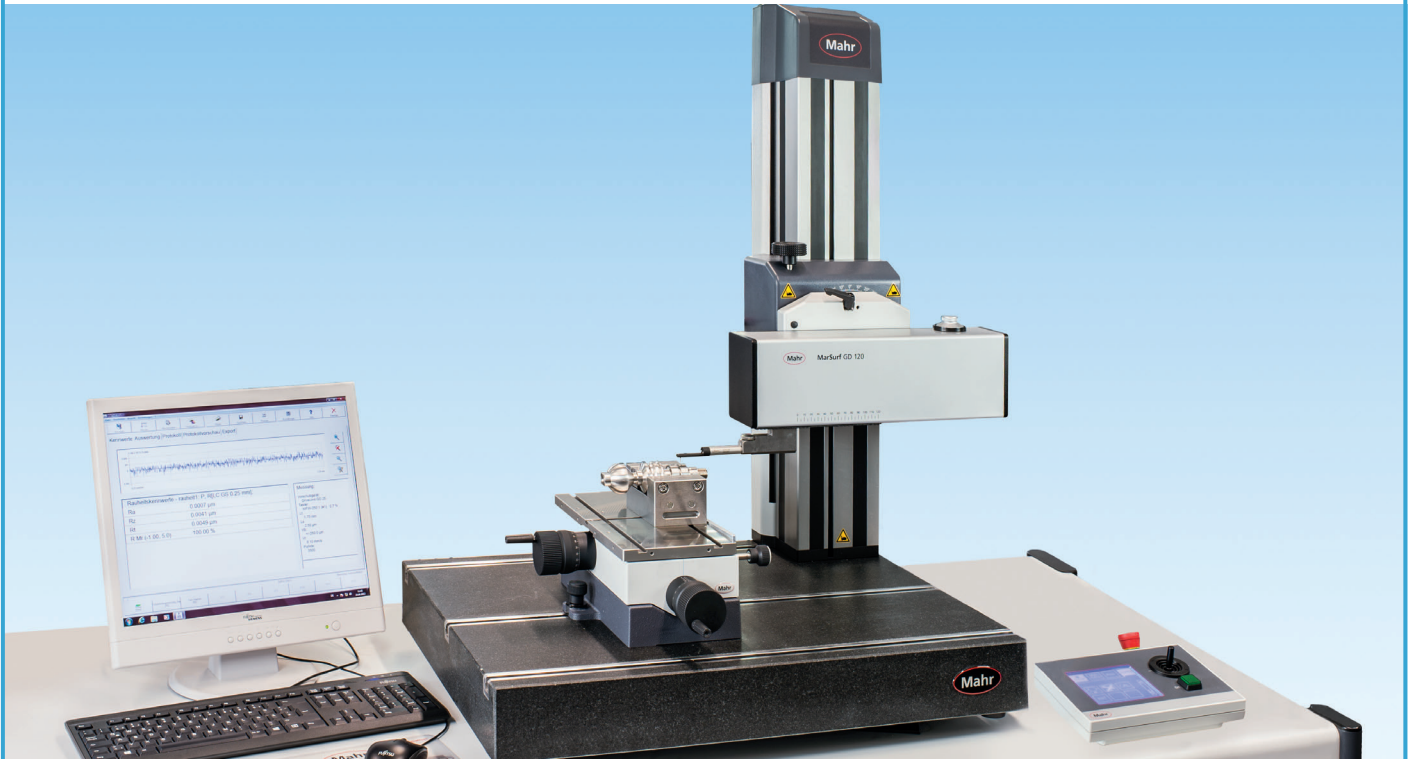
Software options

- Option - Extended evaluation
- Option - Multiple measurements
- Option - Measuring record extensions
- Option - Integration of script programs
- Option - Digital I/O set



MarSurf XR 20

Roughness and waviness measurement made easy



Description

MarSurf XR 20 is the perfect unit for moving into top-flight surface metrology. This PC-based unit supplies all the common parameters and profiles in accordance with international standards, both in the inspection room and on the shop floor. The high-performance **MarSurf XR 20** is the fruit of decades of surface metrology experience combined with forward-looking technology, clear symbols and straightforward operating aids.

Features

- Over 100 parameters may be selected for R, P and W profiles as per ISO / JIS / ASME or MOTIF (ISO 12085)
- Tolerance monitoring and statistics for all parameters
- Fast creation of Quick & Easy measuring programs using Teach-in mode
- Comprehensive logging
- Automatic function for selecting standard-compliant selection of filters and traversing lengths (patented)
- Support for different calibration methods (static / dynamic) with specification of Ra or Rz parameter
- Adjustable servicing and calibration intervals
- Simulation mode to help users familiarize themselves with the system quickly
- Numerous measuring station configurations for customized applications

- Different user levels can be set up
- Flexible system thanks to various options and creation of customer-specific parameters
- Different user levels protect unit from operator error and ensure that no unauthorized users are able to operate the device

Accessories, Software Options

- Connection options for Mahr **GD 25**, **GD 120** drive units
- Software options
 - QS-STAT / QS-STAT plus
 - Dominant waviness
 - User defined parameters
 - Topography



WebCode 20556, 20557

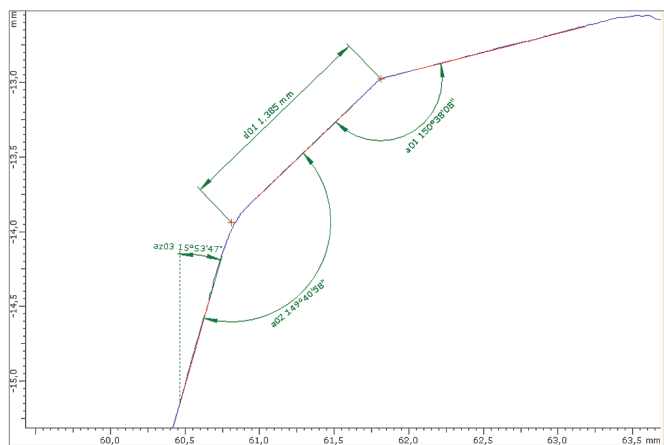
MarSurf XC 2

For entry-level, high-precision contour measurement



Description

Measuring and evaluating geometries of workpieces and tools that are relevant for correct functioning is one of the primary requirements of research, technology and industry. The fast, straightforward and cost-effective 2D contour measuring system is increasingly winning out over other systems. The tried-and-tested, user-friendly **MarSurf XC 2** is the best example of this. Not only does it meet all requirements in terms of accuracy and different evaluation criteria, it also delivers reliable results time after time.



Features

- Creates regression straight lines and circles
- Creates points, intersection points, free points, center points, maximum and minimum points
- Determines radii, distances, angles, coordinates and line form deviations
- Performs nominal/actual comparisons
- Tolerance monitoring
- Associative elements, i.e. immediate change of variables dependent on reference elements when changes occur
- User access rights using password protection prevents incorrect operation
- Excellent calibration procedure thanks to many years' experience, i.e. including geometry calibration, measuring force calibration, bend compensation, etc.
- Stability and rigidity of the probes
- The drive unit is very smooth-running, highly stable and extremely accurate

CD 120 Drive Unit

The **CD 120** drive unit has a patented probe arm mount for fast and flexible changing of probe arms without the need for tools. The calibration data for each probe arm is stored separately. It is also easy to calibrate several identical probe arms.

Features

- Max. measuring range of 120 mm (4.72 in) measuring length and 50 mm (1.97 in) measuring stroke
- Automatic lifting and lowering of the probe arm with adjustable speed
- Variable setting of measuring force from 1 mN to 120 mN
- High positioning speed
- Collision protection thanks to patented probe arm mount

The **MarSurf XC 2** can also be delivered optionally with the drive unit **PCV 200**.

Software

- Software options:
- QS STAT / QS STAT plus
 - Tangential elements
 - Tangential elements (only XC 2)
 - Topography



MarSurf XC 20

The new generation of contour measurement systems

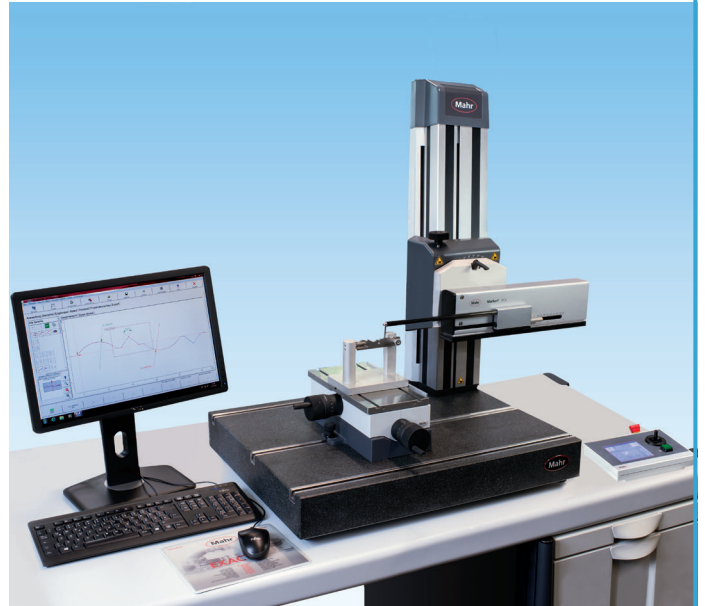
Description

When it comes to contour evaluation, **MarSurf XC 20** is simply the best. What started over 30 years ago with the Conturograph – consisting of a drive unit and x-y plotter – has developed into a state-of-the-art contour measurement system with the very latest technology. This perfectly coordinated configuration of instruments meets the highest performance standards. Both the drive unit and the measuring stand are controlled and positioned using the reliable measurement and evaluation software.

Features

In addition to the functions of the **MarSurf XC 2** entry-level unit, **MarSurf XC 20** also provides additional features:

- Notes on the operating sequence can be displayed
- Interactive control elements support evaluations and automatic operating sequences
- Measurement of upper and lower contours with "twin stylus probe"; these contours can also be evaluated in relation to each other
- Creation of profile sections with evaluations of different parameters for each section
- Segmented measurement across obstacles such as bores or steep sides is possible
- Import of DXF files for nominal/actual comparison
- **PCV 200** drive unit with patented probe arm mount allows tool-free, reproducible changeover of probe arms
- Flexible measuring station thanks to patented probe system
- Manual, freely variable tracing forces also support flexibility
- Synthetic creation of nominal profiles from straight lines and arcs
- Straightforward comparison of nominal and actual profiles. Several ranges can be defined within a measured profile and each of these ranges can be assigned a different tolerance and different evaluations



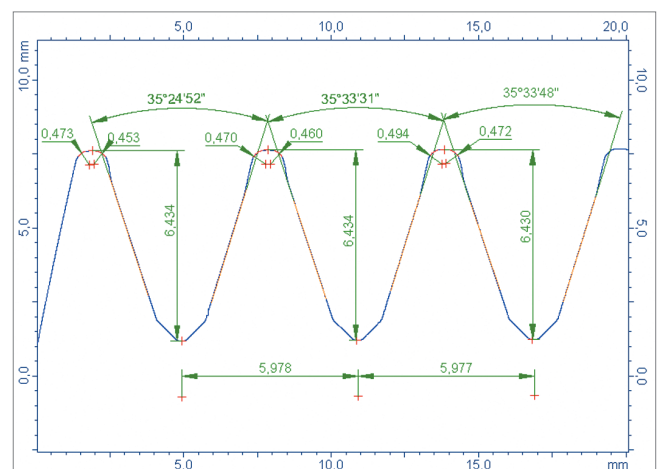
Software

Software options:

- QS STAT / QS STAT plus
- Thread evaluation
- Topography XT 20
- Topography XT incl. MfM
- Topography XT incl. MfM plus

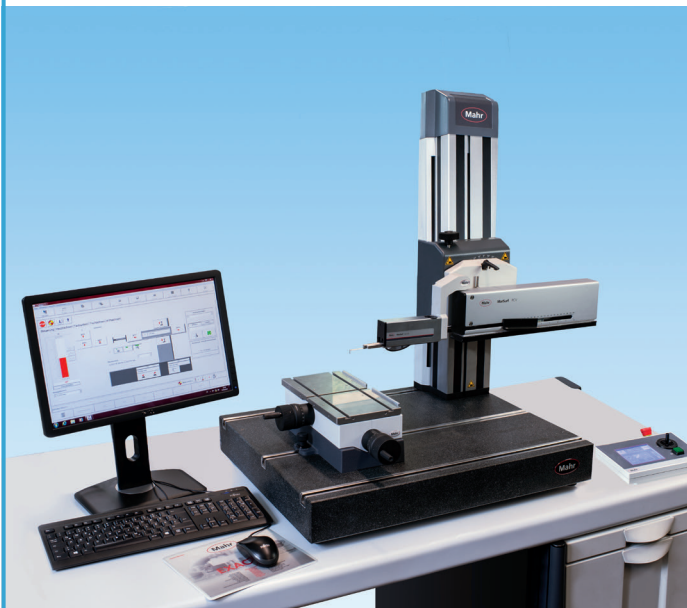


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MarSurf XCR 20

The new generation of combined roughness and contour measurement systems



Description

MarSurf XCR 20 is ideal for combining contour and roughness depth evaluation.

MarSurf XC 20 + MarSurf XR 20 = MarSurf XCR 20

This system includes absolutely everything you need, saving both time and space. There are separate user interfaces for the roughness and contour software. **MarSurf XCR 20** is Mahr's top surface measurement system and enables even semi-automated operating sequences to be performed.

Features

- Saves space because both drive units (**MarSurf PCV 200** contour drive unit and **GD 25** roughness drive unit) can be adapted using the corresponding combi-mount on the **ST 500** or **ST 750** measuring stand
- Roughness and contour evaluations possible from a single measurement
- High-precision contour and roughness evaluation with the **MarSurf UD 130** measuring system on components requiring a large stroke and very high resolution
- Option of rapidly switching between roughness and contour measurements thanks to straightforward changeover within the software platform and changing of mechanical components such as drive unit and probe.

Versions

- Combimeasuring station with one measuring stand and two drive units (**PCV 200** and **MarSurf GD 25**)
- Combimeasuring station with quick-change mounts (**GD 120**, **PCV 200**)
- **MarSurf UD 130** enables high-precision contour and roughness evaluation on components



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MarSurf UD 130 / LD 130 / LD 260

Two in one. Contour and roughness depth measurement in a single stroke

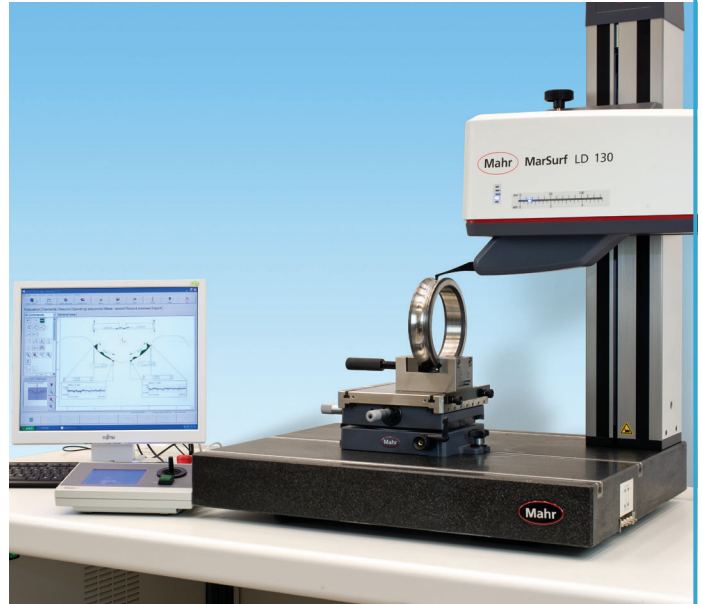
Description

MarSurf UD 130 / LD 130 / LD 260. The step into a new dimension

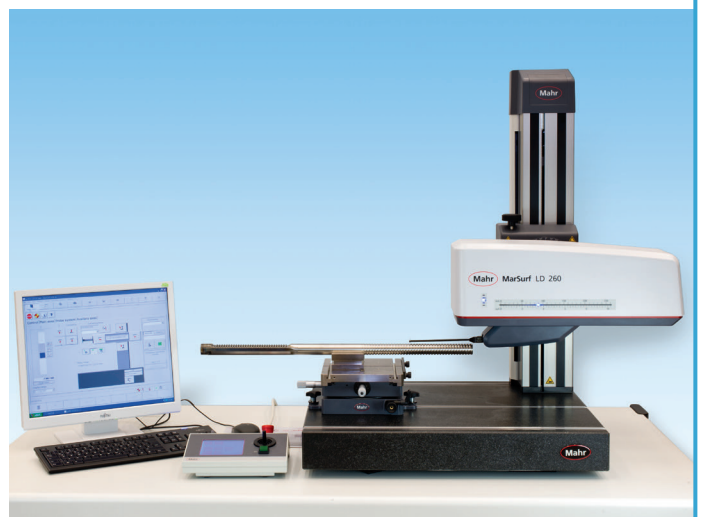
Combining contour and roughness measurements "in one stroke" can be excellently solved with the leading technology of Mahr measuring units. The measuring stations MarSurf UD 120, LD 130 and MarSurf LD 260 are characterized by consistent further development and integration of experiences gained from the first generation of units.

Features

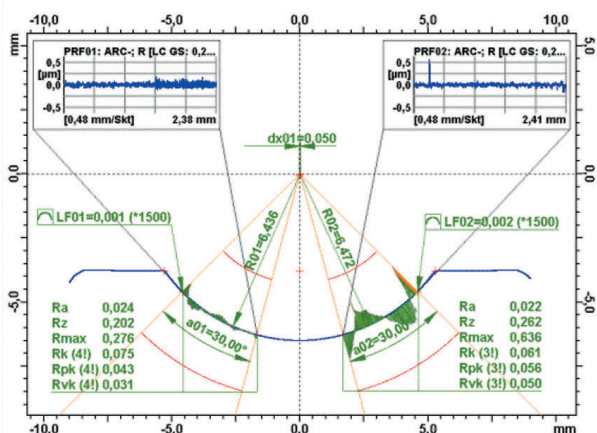
- Large measuring range 130 mm / 260 mm
- Roughness and contour in one measurement
- High measuring and positioning speed greatly minimizes measuring time
- Innovative probe system solution
- Faster and secure exchange of probe arms with simultaneous probe arm recognition by the magnetic holder
- Long measuring path up to 260 mm (MarSurf LD 260) for a measuring stroke of 13 mm (and 100 mm probe arm length) or 26 mm (for 200 mm probe arm length)
- Service-friendly due to modular construction
- Maintenance possible without complete disassembly of measuring stand
- High measuring and positioning speed



MarSurf LD 130



MarSurf LD 260



Versions

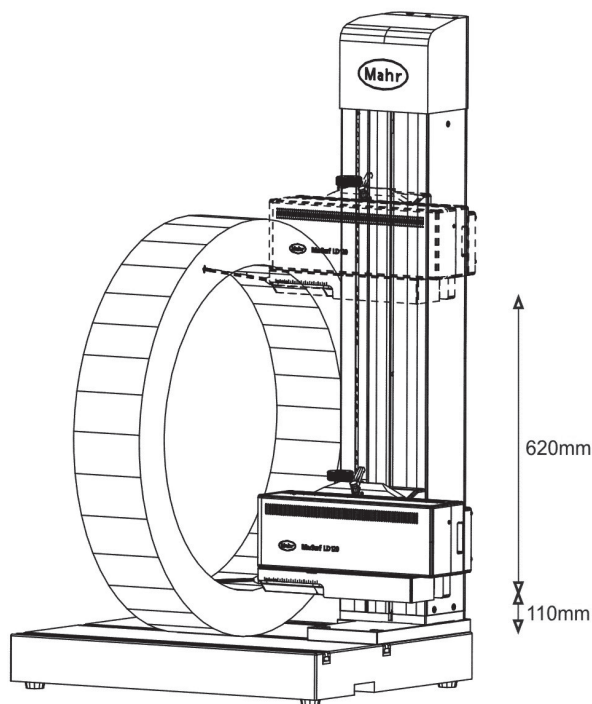
MarSurf UD 130 with measuring stand

Entry into the world of high-precision roughness and contour metrology by means of an integrated optical tracing system.



WebCode 20559, 20808, 20560

MarSurf Measuring Stand ST 750 D. Measuring Contours in New Dimensions



Sketch: UD 120 with ST 750 D

Description

Contour metrology from Mahr has been successfully used by hundreds of customers worldwide for decades. Due to many excellent customer solutions, many of them patented, contour metrology has undergone many important developments.

Mahr was the first manufacturer of contour metrology offering the possibility of measurements with a twin stylus with simultaneous switching of the measuring force. This makes it possible not only to measure contours in one tracing direction but also to perform upside down measurements, thus enabling pairs of opposed profiles to be recorded and set off against each other, for diameter measurements, for example.

Today we are proud to present to you a decisive development that builds upon these possibilities.

In connection with the measuring stand **MarSurf ST 750 D**, the measuring stations UD 130 /LD 130 / LD 260 as well as XC 20 CNC can use the entire measuring length of 620 mm of the vertical axis.

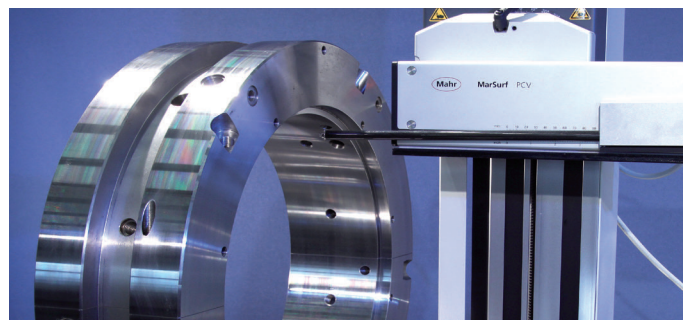
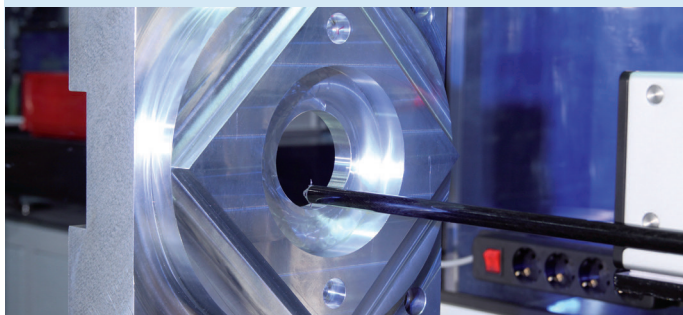
The greatly expanded measuring and evaluation possibilities result from the following basic principle and measuring procedure.

1. Measurement of the lower contour range "measuring force below"
2. Moving the slide on the measuring stand in the upper position.
3. Measuring the upper contour range "measuring force above"
4. Evaluation (distance, diameter) of the two profiles related to each other

By using a twin-stylus probe arm and the UD 130 / LD 130 / LD 260 or PCV drive unit, the individual contour areas are measured using a measuring program. After the geometries of the upper side of the ring have been measured, the slide of the measuring stand moves the drive unit down by the diameter range of the workpiece. Now the geometries of the lower side of the ring are measured.

An exact computation of the travel path of the slide on the measuring stand enables the reference dimensions of the upper and lower contour to be related to each other.

This enables the measurement of diameters, distances and contours in the range up to 620 mm.



Technical Data

Positioning length:	620 mm (deepest position approx. 110 mm above the granite plate)
Traversing length:	620 mm
Working temperature	21°C ±1° K ¹⁾
Accuracy	
with UD 130 /LD 130 /LD 260	MPE ±(1.4 + L/100) μm L = measuring length in mm ²⁾
with PCV	MPE ±(2.5 + L/100) μm L = measuring length in mm ³⁾
Workpiece weight:	Up to 90 kg with XY table CT 200

1) A deviating working temperature can lead to a deviation in accuracy

2) With probe arm item no. 6852008

3) With probe arm item no. 9045820

MarSurf LD 130 Aspheric / LD 260 Aspheric

High-precision 2D / 3D Measuring Station for Measurement and Evaluation of Optical Components



Description

An increasingly more compact and favorable system design is demanded on optical systems such as zoom lenses, optics for DVD drives and lenses in the cameras of mobile phones, for example. For this purpose, in addition to classic spherical lens shapes (sphere-shaped), the optics industry is increasingly producing aspherical (not sphere-shaped) lenses.

The evaluation program serves to analyze measurements on spherical surfaces with Mahr contour measuring units. Measured profiles are imported, the nominal form of the aspheres are defined and the residual error is determined compared to the nominal form.

The data of the determined differential profile is made available in a machine-readable format for readjustment of the processing machine (closed loop).

In comparison to the laser interferometer, the tactile measuring technology also allows 2D and 3D measurement of optically rough surfaces, so that testing and correction is possible already early on in the production process (grinding).

Measuring Principle

For a 3D measurement, two parallel linear profiles offset by 90° are measured across the zenith of the asphere. The several concentric circular profiles are gathered by turning the C-axis. These measured points are used to create the topography.

As the probe arms can be positioned automatically, i.e. lifted-off and contact, even discontinuous surfaces, e.g. with a hole in the center, can be measured.

The use of the machine in a vibration-damped enclosure keeps ambient influences such as vibrations and impurities away from the measuring object.

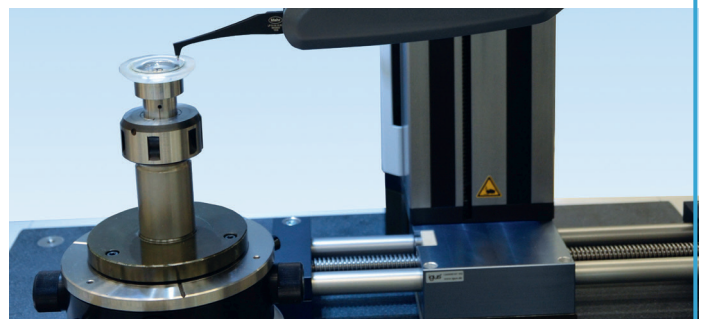
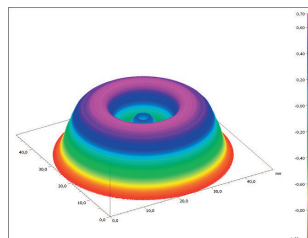
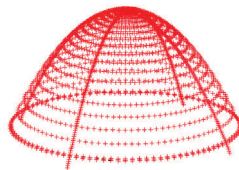
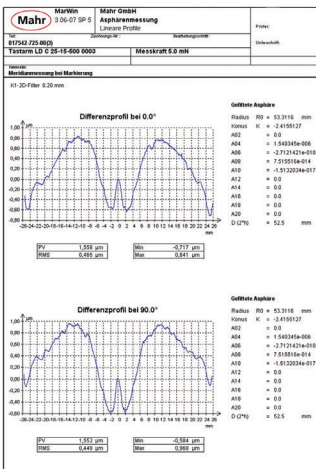
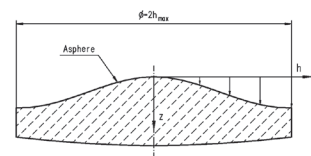
Asphere Definition

An aspherical surface is a refracting or reflecting surface which deviates from a spherical surface.

The mathematical description of the sagitta Z (dependence of the vertical height to the horizontal coordinates) of aspherical surfaces based on a conical section is given in the following equation:

$$z(h) = \frac{h^2}{R_0} \sqrt{1 - (1 + k) \left(\frac{h}{R_0}\right)^2} + \sum_{n=2}^{\infty} A_{2n} \cdot h^{2n}$$

R_0 = Radius of curvature
 h = Radius of the area of application of the asphere
 k = Conical constant
 A_i = Aspheric coefficients

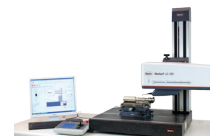
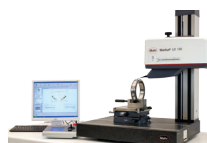
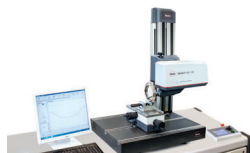


MarSurf Data Overview XR 1 / XR 20



	MarSurf XR 1	MarSurf XR 20
Parameters	Over 80 parameters for R-, P-, W-profiles as per current standards ISO/JIS or motif (ISO 12085)	Over 100 roughness, waviness, P-profiles and motif parameters
Probe	BFW skidless probes system with drive unit MarSurf SD 26 and/or skidded probe system PHT with drive unit MarSurf RD 18	MFW 250, R probe
Drive Unit	Skidless tracing - BFW-250 probe, skidded tracing - RD 18, RD 18 C, RD 18 C2	Usable GD 25, GD 120
Traversing length	SD 26: automatic; 0.56 mm; 1.75 mm; 5.6 mm; 17.5 mm; 56 mm; measure to stop; variable RD 18: automatic; 1.75 mm; 5.6 mm; 17.5 mm	Depending upon drive unit 0.56 / 1.75 / 5.6 / 17.5 / 56; Lt var 0.56 to 120.0
Measuring range	SD 26: ± 250 µm (with double probe arm length ± 500 µm) RD 18: ± 350 µm	
Measuring force (in Z)	0.7 mN	
Resolution (Z)	±25 µm / 0.7 µm; ±250 µm / 7 µm; ±2500 µm / 50 µm	± 25 µm = 0.5 nm; ± 250 µm = 5 nm

MarSurf Data Overview UD 130 / LD 130 / LD 260



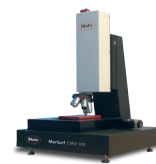
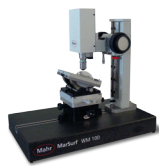
	MarSurf UD 130	MarSurf LD 130 / LD 260
Parameters	Roughness parameters, waviness parameters, P-parameters, see MarSurf XR 20	Roughness parameters, waviness parameters, P-parameters, see MarSurf XR 20
Contour elements	Radii, distances, angles, see MarSurf XC 20	Radii, distances, angles, see MarSurf XC 20
Probe	LP D 14-10-2/60	LP D 14-10-2/60 LP D 14-10-500
Drive unit	MarSurf UD 130	MarSurf LD 130 / MarSurf LD 260
Traversing length	0.1 mm to 130 mm	0.1 - 130 mm / 0.1 - 260 mm
Measuring range	10 mm	13 mm (100 mm probe arm) 26 mm (200 mm probe arm)
Measuring force (in Z)	1 mN to 30 mN	0.5 mN to 30 mN, can be set by software
Resolution (Z)	2 nm	0.8 nm
Positioning speed	0.1 to 30 mm/s	0.02 mm/s up to 200 mm/s
Residual value when $v_t = 0.1$ mm/s	$Rz_0 \leq 40$ nm	$Rz_0 \leq 20$ nm $Rq_0 \leq 1$ nm, typical

MarSurf. Data Overview XC 2 / XC 20



MarSurf XC 2 / XC 20	
Parameters	Radii, angles, distances, coordinates, fitting in of regression straight lines, best-fit circles, circle sections. Defining points, circles and circle sections and much more. Multiple measurements, double contours, DXF import (only XC 20)
Probes	350 mm probe arms, 175 mm probe arms complete with probe stylus tips
Drive unit	MarSurf CD 120 / MarSurf PCV 200 (only XC 20)
Traversing length	1 mm to 120 mm, 1 mm to 200 mm (only XC 20)
Measuring range	± 25 mm with 350 mm probe arm
Profile resolution	350 mm probe arm = 0,5 µm; 175 mm probe arm = 0,25 mm
Measuring force (in Z)	1 mN to 120 mN, variably adjustable
Dimensions (L x B x H)	Approx. 700 mm x 550 mm x 720 mm (of compl. meas. stand ST 500)
Weight of measuring station	Approx. 140 kg (with ST 500 meas. stand)
Power supply	230 V (or 115 V possible)

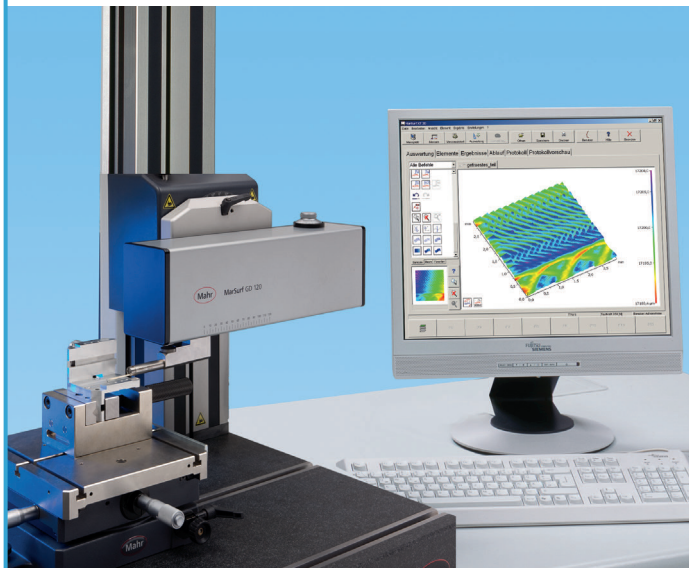
MarSurf WM 100 / CWM 100. Data Overview



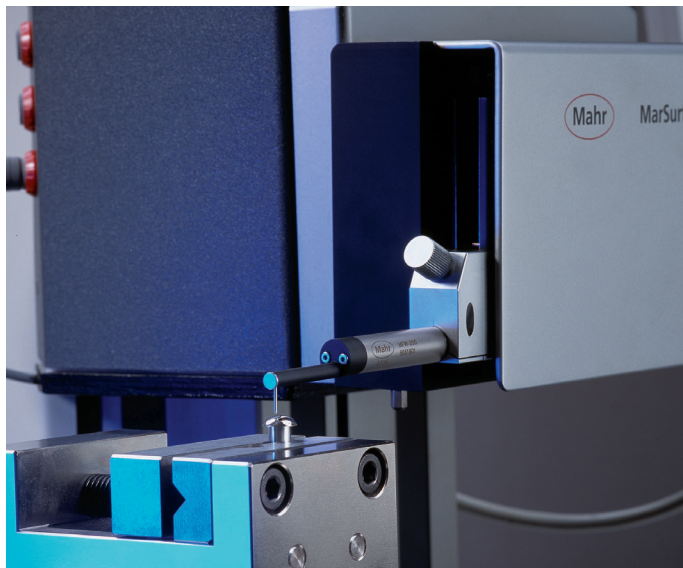
	WM 100	CWM 100
Measuring principle	Interferometric, white light-interferometric light source (WLI): high-performance-LED, 505 nm	Interferometric, white light-interferometric and confocal light source (KFM and WLI): high-performance-LED, 505 nm
Measuring range	Sensor unit can be manually moved over 200 mm manually in Z Object table can be manually moved in X and Y Interferometer, white light-interferometric: Measuring range (WLI): up to 100 µm (vertically)	Sensor unit movable 100 mm in Z, CNC-controllable object table movable 100 mm in X and Y, CNC-controllable Interferometer, white light-interferometer light source (WLI): up to 4 mm (depending upon lens) Confocal microscope: Measuring range (KFM): up to over 800 µm (depending upon resolution in Z and lens)

MarSurf XR 20 with Topography XT 20

Upgrade to a powerful topography measuring station



3D measurement of molds for use in the medical industry



Description

For some applications, a single tactile profile of the surface form is inadequate. 3D topographic representation and evaluation offers the opportunity to obtain more comprehensive profile information. The **MarSurf XR 20** measuring station can be turned into a topography measuring station both simply and cost-effectively, whether based on an order or an upgrade requirement. All that is needed in addition to the standard scope of delivery is a **CT 200-MOT** Y-drive for the **CT 200** XY table and the **MarWin XT 20 software**.

Description

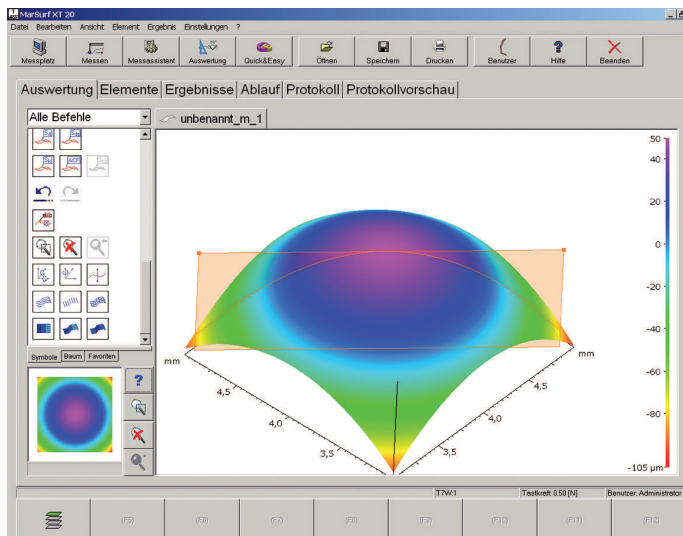
In the case of molds for items such as contact lenses, the surface topography is also of interest in addition to the individual profile for determining the roughness depth. The form and surface roughness depth over the entire topography range are critical when it comes to product function.

Measuring Station Components

As described on pages 15-17 to 15-21, plus:
Topography measuring station extension
MarSurf XT 20 software Order No. 6299034
CT 200-MOT Y-drive Order No. 6710548

CT 200-MOT Technical Data

CT 200-MOT technical data as for CT 200 but with motorized Y-drive
 Adjustment path in Y 17.5 mm (0.7 in)
 Resolution 0.375 μm (15 μin)



MarSurf CNC modular

Description

Beginning with a standard surface measuring station, by adding additional table axes and a measuring enclosure it can be turned into a convenient, semi-automatic CNC measuring station.

- Plug and play configuration between control
- Easy to operate via MarSurf
- "Clever" universal concept for workpiece mounting and clamping
- Minimal training required

Delivery scope:

- Measuring station MarSurf XR 20 with GD 120
- alternatively: Measuring station MarSurf XC 20 with PCV
- alternatively: Measuring station MarSurf LD 130 / LD 260
- Including midrange control CNC
- Measuring stand MarSurf ST 500 / 750 CNC
- Manual control panel MCP 21

Optional table axes

- T1S-L linear axis 200 mm
- T1S-R rotational axis
- T3S-LLR 3 table axes consisting of 2 linear and one rotational axis

Optional measuring enclosure

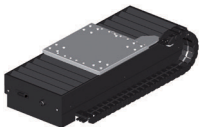
Accessories:

Table plate with clamping ball adapter and universal clamping plate.

Upgrade from a standard measuring station to MarSurf CNC modular.



Technical Data



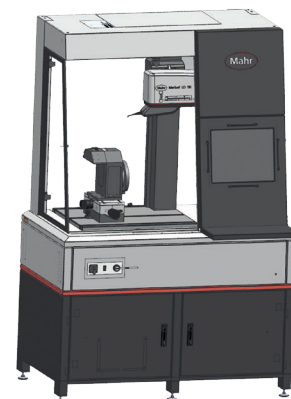
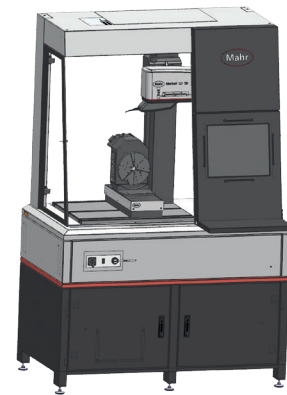
T1S-L linear axis
Including control modul for midrange CNC
Adjustment range 200 mm
Dimensions 510 mm x 200 mm x 200 mm
Load 50 kg



T1S-R rotational axis
Including standard mounting plate and control module for midrange CNC
Usable as TA- or TC-axis
Dimensions 270 mm x 200 mm x 210 mm
Load 30 kg



T3S-LLR 3-axis combination
Including standard mounting plate and control module for midrange CNC
Multi-axis, monolithic construction from the axes TX-TY-TC
Load 30 kg



Applications

Measuring on the shop floor

- Palette measurements
- Topography measurements
- Multiple measuring points on one part without reclamping
- Automatic alignment of the X-axis
- Universal measuring station for various measuring tasks
- Automatic zenith search



WebCode 20569

MarSurf CNC premium



Description

The MarSurf CNC concept offers the high quality solution in fully automatic production processes for roughness depth and contour measurements.

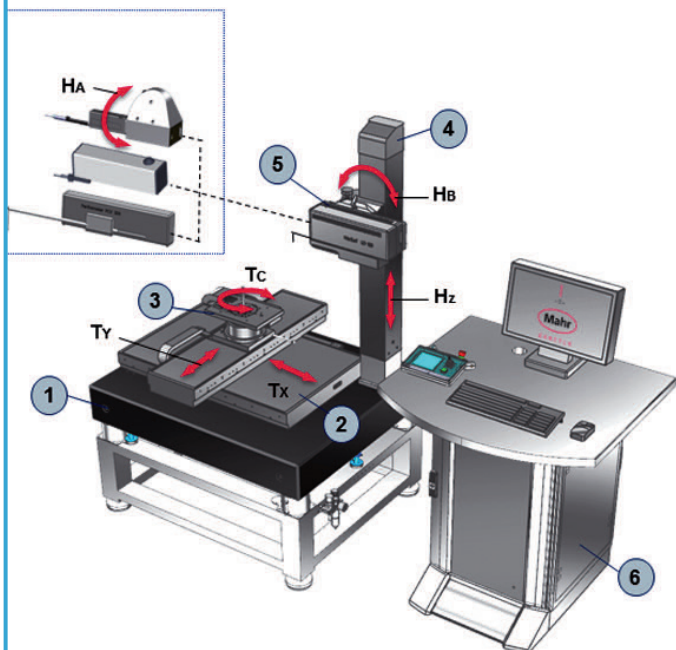
With this measuring station concept, Mahr has set standards worldwide. Complex measurement tasks can be performed reliably and process-safe fully automatically without operator influence. In conjunction with the probe arm changing unit, fully automated processes are possible even in complex diverse measurement tasks without operator influence by manual probe arm exchange.

A coordinated component program from various motorized table and auxiliary axes as well as the proven drive units and probe systems are the ideal basis for an optimal solution.

With the Mahr software platform MarWin you are using a sophisticated, modular, cross-product control and evaluation system that provides the necessary flexibility and process reliability especially for CNC operation.

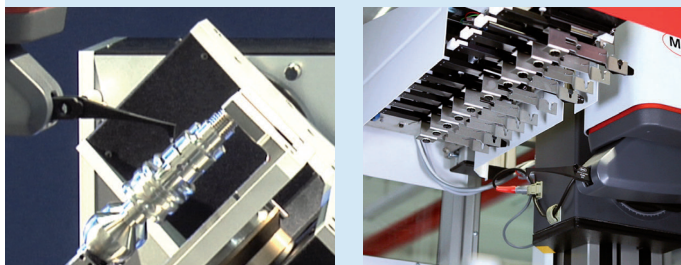
Probe arm changing unit TWE

Up to 10 different LD probe arms can be changed fully automatically.



Basic measuring station

1. Base with regulation (pneum.)
2. Table axes
3. Adapter plate
4. Measuring column
5. Drive unit, adapted to the measuring task
6. Work station with accessories



Your advantages with MarSurf CNC premium

- Universal machine concept for the automatic measurement of workpiece contours and roughness depths
- Based on the size of the workpiece, the workpiece weight and the geometry, appropriate models and an optimally suited table and auxiliary axes system provide the basis for the measuring station configuration.
- An environmentally-suited enclosure system including the necessary security modules is available
- In addition to the manual workpiece loading, an automatic loading station can be configured

Application

Automotive industry

- Injection technology components
- Motor parts: cylinder heads, cylinder block, crankshaft, camshaft, conrod
- Automatic transmission
- Rack/steering nut
- Brake system components

MarWin Software

Description

The software platform MarWin gives the user the possibility to use a service that is characterized by ease of operation and various measuring and evaluation criteria. Standardized symbols, clearly structured operation processes even for different applications, an explicit regulation of user rights, are only some of the many features that make it easier for the user.

Operation is made easier with clearly recognizable symbols. Since many operators create measuring procedures according to their own priorities, symbols can be selected as favorites. Help can be activated for the selected symbol at any time.

The setting of the measurement conditions, the positioning of the probe in the "loading position" as well as measuring position and the positioning after the measurement together with all conditions are configured in the "measuring assistant".

Multiple measurements, notes during a measurement procedure and much more are provided in easily manageable operation procedures.

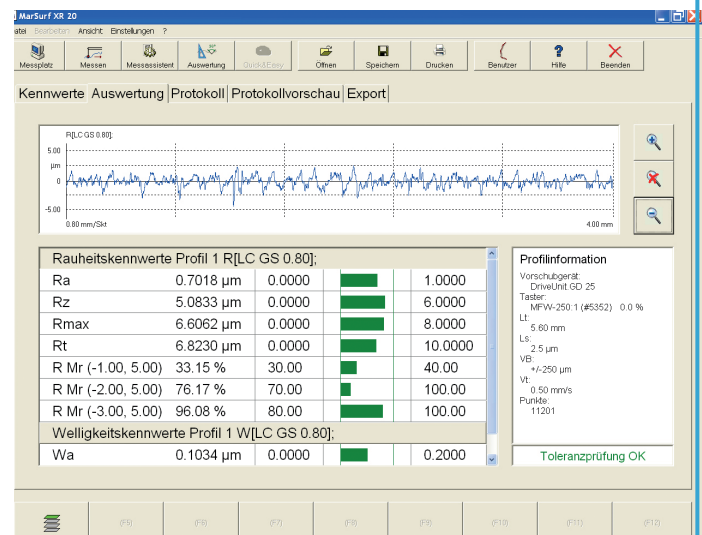
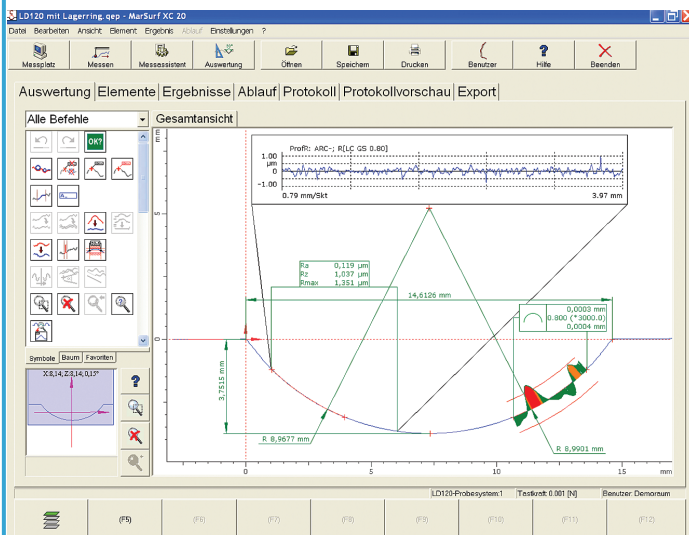
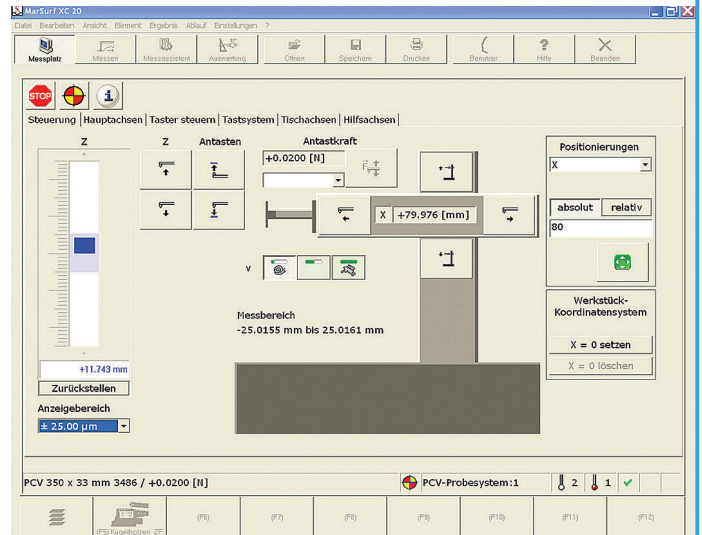
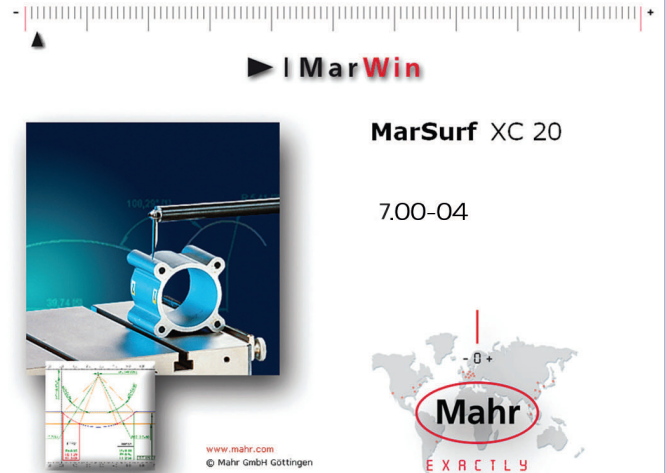
Top technology even in the software

Years of further development of the contour-roughness depth software and topography software with the possibility to select additional interesting options give the user access to one of the most high performing platforms worldwide.

Thanks to an easily understandable user interface, the steps of the measuring and evaluation procedures can be carried out quickly and in a user-friendly manner.

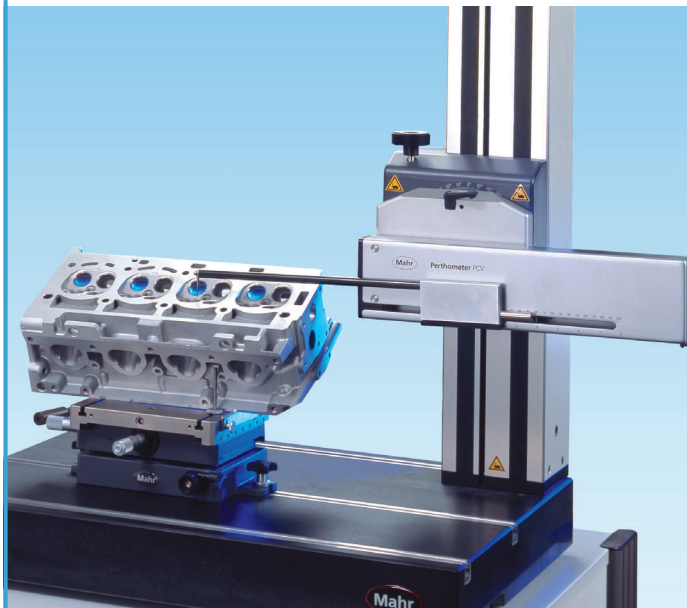
Expansion options

like Data Export QS STAT, Thread Evaluation and others are available.



MarSurf PCV 200 Drive Unit

Contour drive unit



Description

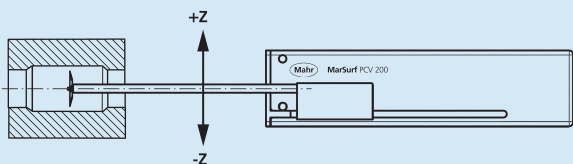
The **PCV 200** contour drive unit supports measuring paths of up to 200 mm (7.87 in).

Many contour measurement tasks, e.g. calculating double contours using the twin stylus, can be performed in conjunction with the **MarSurf XC 20** software.

Features

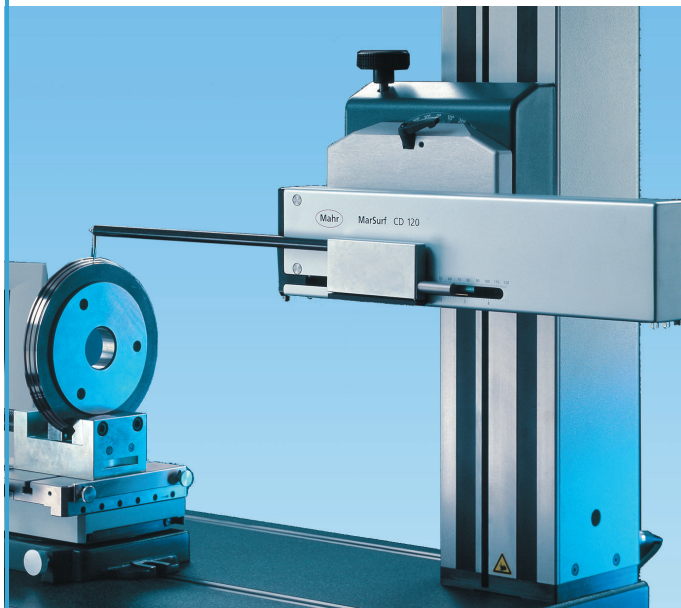
- Probe arm collision protection thanks to patented probe arm mount
- Programmed measuring run with lifting and lowering of the probe arm and positioning
- Selection of different measuring speeds ranging from 0.2 mm/s to 4 mm/s (0.008 in/s to 0.16 in/s)
- Variable setting of measuring force from 1 mN to 120 mN
- Measuring force remains constant over the entire measuring range

The drive unit supports a large number of probe arms of different shapes and sizes.



MarSurf CD 120 Drive Unit

Contour drive unit



Description

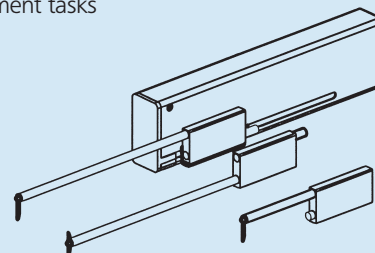
The **CD 120** contour drive unit is based on the technology of the **PCV 200** drive unit. It measures contour elements such as radii, distances, angles, etc. simply and precisely.

In conjunction with the **MarSurf XC 2** software, it constitutes the basic contour measurement unit.

Features

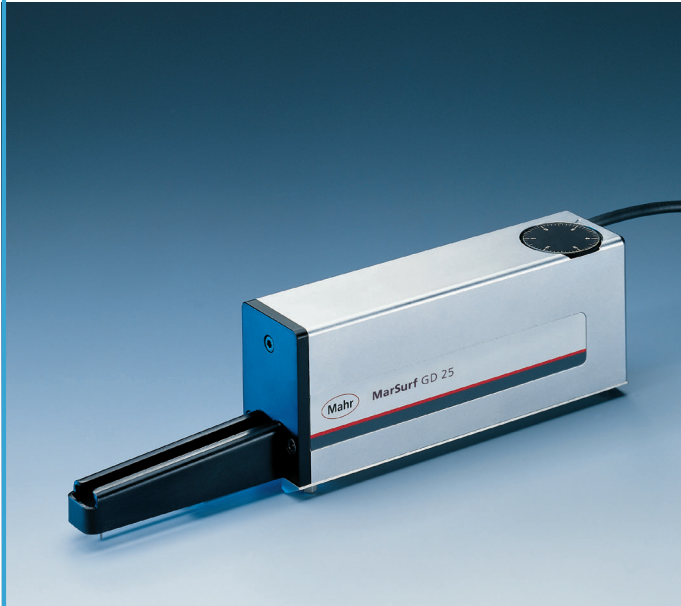
- Automatic lifting and lowering of the probe arm with adjustable speed
- Probe arms available for bores larger than 2 mm (0.079 in)
- Selection of different positioning speeds ranging from 0.2 mm/s to 10 mm/s (0.008 in/s to 0.39 in/s)
- Variable setting of measuring force from 1 mN to 120 mN
- Patented probe arm mount for reproducible probe arm exchange without the need for tools

The use of complete probe arms, each with their own separately stored calibration data, allows the evaluation system to switch between different measurement tasks quickly and flexibly.



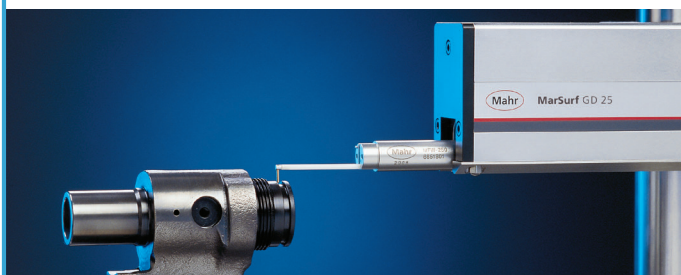
MarSurf GD 25. Drive Unit

The standard drive unit for surface measurements



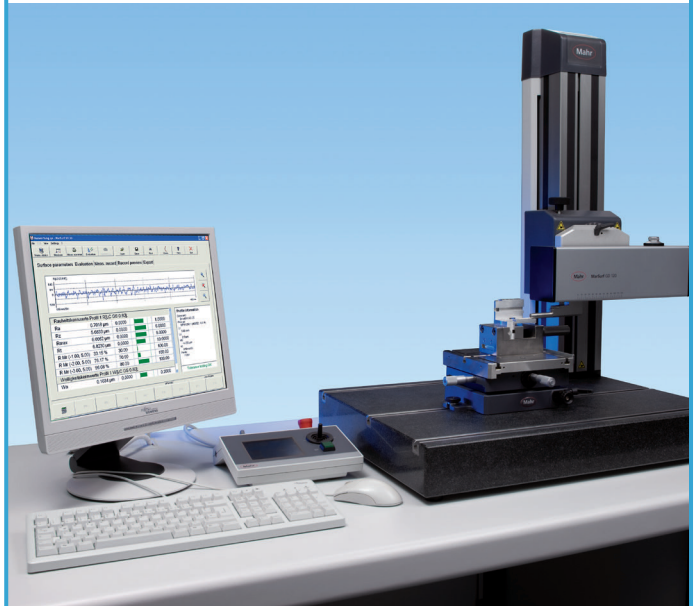
Description

This unit provides excellent straightness precision and smooth running over a measuring length of 25.4 mm (1 in). A patented motorized height adjustment accessory ensures the probe is positioned in the range of 4 mm (0.15 in) and enables motorized probe zero setting. The MFW 250 B skidless probe can be used along with all probes of the R series.



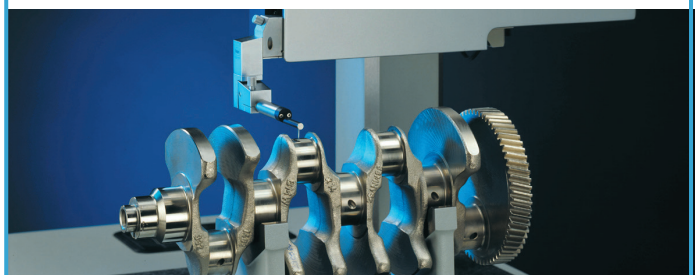
MarSurf GD 120. Drive Unit

The high-precision drive unit of the new generation



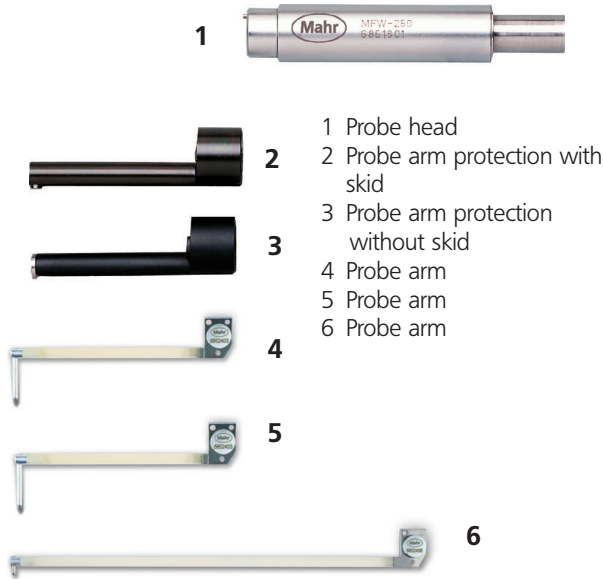
Description

In addition to high-precision roughness measurements, the **GD 120** drive unit is used for waviness measurements over long traversing lengths of up to 120 mm (4.72 in). Patented motorized probe zero setting over 10 mm (0.39 in) saves both setup work and time. The drive unit optionally supports problematic measuring positions such as transverse or vertical tracing using simple, adaptable probe mounts. The **GD 120** allows precise positioning on the X-axis. In addition to very quiet running (residual value $R_z < 30 \text{ nm}/0.1 \text{ mm/s}$), this unit offers fast probe clamping and also protects the unit by means of a collision protection device on the probe mount.



MarSurf. Accessories

Probes for virtually any application



Probe system MFW 250 B

Probe system with magnetic holder principle for probe arms. The MFW probe system can be used as a skidless or skidded probe. It is distinguished by the following characteristics:

- low linearity deviation (< 1 %),
- high resolution (100,000-/200,000: 1),
- large measuring range ($\pm 250 \mu\text{m}$).

Double length tracing arms enlarge the measuring range to $\pm 500 \mu\text{m}$.

The simple tracing arm interchange ensures a particularly wide field of application. The rugged, rigid design avoids natural vibration.

Accessories

Depending upon the measuring task, different accessory components, parallel vices or prisms can be ordered.

XY table CT 300

Table surface 300 mm x 150 mm
 XY-adjustment by 25 mm each using micrometer caliper.
 C-axis adjustable by $\pm 2.5^\circ$ for highly precise workpiece alignment

Order No. 6710530

XY table CT 120

for mounting and aligning workpieces.
 Can be adjusted in two coordinates by 15 mm (.591).
 Table surface: 120 mm x 120 mm (4.728 in x 4.728 in) with two brackets.

Order No. 6710529

PP vee-block

with four different prisms for mounting axis-symmetrical workpieces with diameters from 1 mm to 160 mm.
 Incl. clamping springs for holding light workpieces in the prism.

Order No. 6710401

PPS parallel vice

for clamping measuring objects

Order No. 6710604

Parallel vice

for clamping small workpieces
 Jaw width 32 mm
 Dimensions (L x W x H): Approx. 130 mm x 32 mm x 40 mm

Order No. 6710631

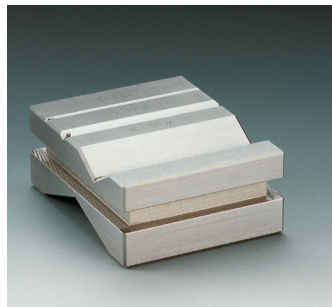
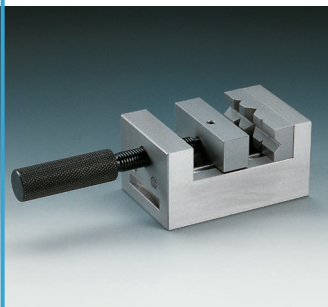
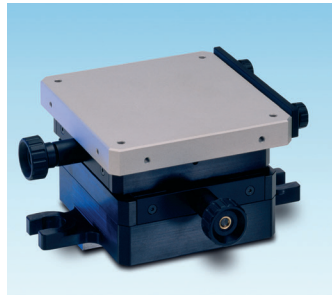
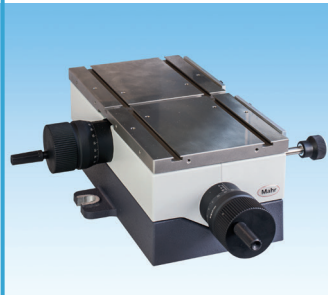
Parallel vice with joint

axis can be swiveled by $\pm 45^\circ$

Order No. 6710632

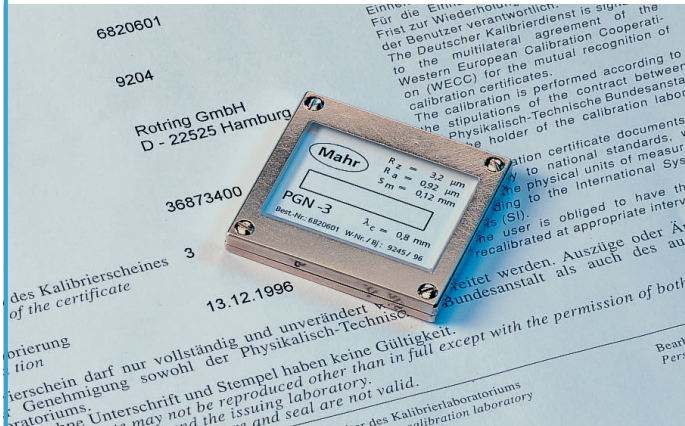
Parallel vice with angled foot

Order No. 6710633



PGN Geometric Standard

DIN EN ISO 5436 type C1 sinusoidal groove profile



Surface roughness standard with a sinusoidal groove profile. Profile depth approx. $3 \mu\text{m}$ ($120 \mu\text{in}$), groove spacing approx. 0.12 mm ($.00472 \text{ in}$). For checking the roughness measuring station. The following types are available:

- PGN 1** Profile depth approx. $1.5 \mu\text{m}$, groove spacing approx. 0.10 mm
- PGN 3** Profile depth approx. $3 \mu\text{m}$, groove spacing approx. 0.12 mm
- PGN 10** Profile depth approx. $10 \mu\text{m}$, groove spacing approx. 0.20 mm

DAkS/DKD and Mahr calibration certificate upon request.

MSS-3 Surface combination standard

DIN EN ISO 5436 type A1 surface combination standard



Surface measurement standards are used for dynamic adjusting and calibrating the vertical profile components of surface texture measuring instruments. The optical flat is needed to determine vibrations of the measuring station and verify the straightness deviation of the drive unit's datum plane. Sine-wave periodic profiles are for testing the drive speed and motion.

DAkS/DKD and Mahr calibration certificate upon request.

PRN 10 Geometric Standard

Turned roughness profile



With Mahr calibration certificate. Roughness standard with turned profile, chromed. Profile depth approx. $10 \mu\text{m}$ ($.394 \mu\text{in}$). For checking the roughness measuring station. R_a , R_z , R_{max} .

KN 100 Contour Standard

Standard for test contour measuring systems



The contour standard **KN 100** was developed in cooperation with the PTB. Testing for confirmation and acceptance purposes can now be conducted traceable back to the PTB due to concrete reference to realistic geometries. The standard fulfills the requirements of the VDI/VDE guidelines 2629.

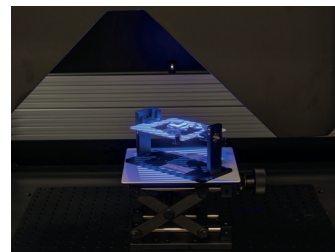
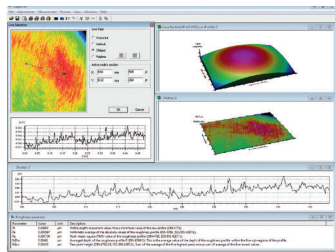
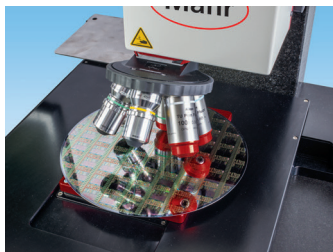
MarSurf. Optical metrology from Mahr

3D measuring systems for surface analyses and component geometries

► | In addition to tactile metrology, optical metrology has become important, especially in recent years. Reasons for choosing visual inspection of workpieces are manifold:

- No damage or deformation on soft or liquid surfaces
- No wear of the sensing elements
- Time gained by area measurements and also evaluation of new standardized area parameters
- Statistically reliable results of heterogeneous surfaces with no clearly defined machining directions
- Fast and complete measurement of component geometries

With Mahr as your metrology partner you get the solution that is right for you. Decades of experience with both tactile as well as optical sensors give you the guarantee to get reliable results with the suitable device. ◀ |



MarSurf CWM 100

Description

The high-precision, computer-controlled optical measuring instrument **MarSurf CWM 100** with subnanometer resolution. A combined 3D measurement system consisting of a confocal microscope and white light interferometer.

- Universal suitability for technical, optical and reflective surfaces, and surfaces of printed circuit boards and semiconductors and biological tissues
- 2D surface analysis and measuring evaluation
- Topographic 3D surface analysis and measuring value evaluation
- Fast measurements – short measuring times
- Microscopic image field dimensions, easily extendable with fully automatic stitching process
- Automatic table and object positioning: 100 mm x 100 mm, longer distance upon request
- Large selection of objectives enables ideal adaptation to the measuring object
- Solid construction with granite base plate and granite column for best vibration damping
- Professional evaluation software based on MountainsMap[©]

Delivery scope

- Sensor system, consisting of:
 - Confocal microscope KFM with 6x objective turret
 - Camera 768 pixel x 582 pixel, up to 48 images/s
 - CNC-controlled Z-axis with integrated Heidenhain glass scale
 - WLI software module, software "Inspector"
- Granite base and column with sensor system and CNC-controlled object table
- Motorized multi-axis control for Z-axis and XZ table for sample positioning and image field merging
- Objective 50x0.8 EPI (confocal microscope)
- Objective 20x0.4 DI (white light interferometer)

Applications

Mechanical engineering

Metallic surfaces of all types (ground, rolled, etc.), also laser-textured surfaces, ceramic and plastic surfaces, surfaces of molds

Medical industry

Metallic, ceramic and plastic surfaces of implants, prostheses and instruments.

Electronics industry

Surface analysis of coatings, measurement and analysis of electronic and semiconductor components.

Optics industry

Form and roughness analysis of diverse optical components (all materials).



Accessories

Tilting table CT 120, biaxial
Angle adjustment table +/-30°
Set of standards

Confocal microscope:

KFM objectives 10x0.5; 20x0.75; 50x0.6 with 11 mm wd; 50x0.8; 100x0.9 and many more

White light interferometer:

WLI objectives 2.5x0.075; 5x0.13; 10x0.3; 20x0.4; 50x0.55; 100x0.7

Vibration damping

With optional active vibration damping for optimum damping of vibrations for measuring in the nanometer and subnanometer range.

Technical Data

Measuring principle	Interferometric, white light-interferometric and confocal light source (KFM and WLI): high-performance-LED, 505 nm
Measuring range	Sensor unit movable 100 mm in Z, CNC-controllable object table movable 100 mm in X and Y, CNC-controllable Interferometer, white light-interferometer light source (WLI): up to 4 mm (depending upon lens) Confocal microscope: Measuring range (KFM): up to over 10 mm (depending upon resolution in Z and lens)



WebCode 20566

MarSurf WM 100



Description

The high-precision optical measuring unit **MarSurf WM 100** subnanometer resolution and measuring accuracy. A 3D white light interferometer measuring system.

- Universal suitability for optical and reflective surfaces, fine technical surfaces as well as surfaces of printed circuit boards and semiconductors and biological tissues
- 2D surface analysis and measuring evaluation
- Topographic 3D surface analysis and measuring evaluation
- Fast measurements - short measuring times
- Manual table and object positioning in up to 4 axes
- Large selection of lenses enables the ideal adaptation to the measuring object
- Sturdy construction with granite base plate
- Professionelle Auswertesoftware auf Basis von MountainsMap®

Delivery scope:

- Sensor system consisting of:
 - WLI Sensor head
 - Camera 768 pixel x 582 pixel, up to 48 images/s
 - 100 µm Z-axis with Piezo drive
 - WLI software module, software "Inspector"
- Granite base and column with manual Z-positioning of the sensor system
- Manual XY-objective table for sample positioning
- Objective 20x0.4 DI (white light interferometer)

Technical Data

Measuring principle	Interferometric, white light-interferometric light source (WLI): high-performance-LED, 505 nm
Measuring range	Sensor unit can be manually moved over 200 mm manually in Z Object table can be manually moved in X and Y Interferometer, white light-interferometric Measuring range (WLI): up to 100 µm (vertically)

Applications

Mechanical engineering

Fine metallic surfaces of all kinds (ground, rolled, etc.) also laser-structured surfaces, fine ceramic and plastic surfaces, surfaces of molds.

Medical industry

Metallic, ceramic and plastic surfaces of implants, prostheses and instruments.

Electronics industry

Surface analysis of coatings, measurement and analysis of electronic and semiconductor components.

Optics industry

Roughness analysis of diverse optical components (all materials).

Accessories

Tilting table CT 120, biaxial

Angle adjustment table +/-30°

Set of standards

White light interferometer:

WLI objectives 2.5x0.075; 5x0.13; 10x0.3; 20x0.4; 50x0.55; 100x0.7

Vibration damping

With optional active vibration damping for optimum damping of vibrations for measuring in the nanometer and subnanometer range.



WebCode 20565

MarSurf Topography Software XT 20, MfM, MfM plus

Description

Surface structures that are functionally relevant can often only be assessed and evaluated when depicted as a 3D topography.

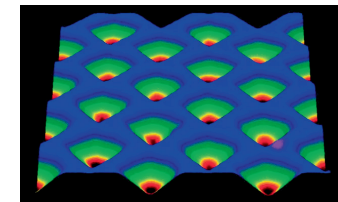
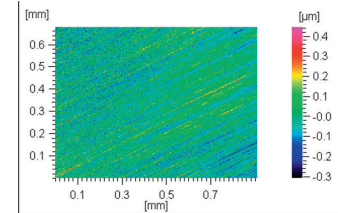
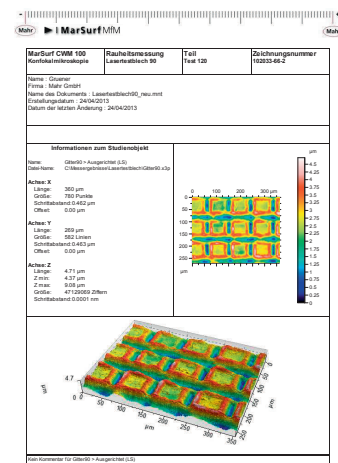
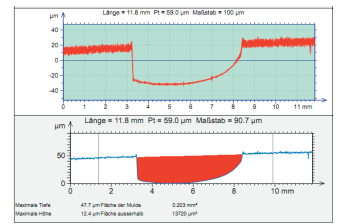
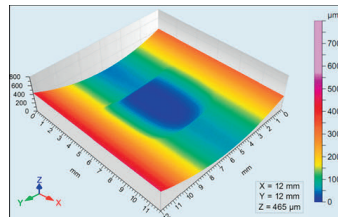
With the surface evaluation options **MarSurf XT 20**, **MarSurf MfM** and **MfM plus** you receive optimally tailored topography packages that can be used with tactile as well as optical metrology.

The easy availability of different depiction types, such as:

- 2D depiction of tracing section
- 3D topographical image
- false-color depiction
- photo-realistic depiction and much more

enable a comprehensive and clear evaluation of the surface structure.

For topographical evaluation, wear testing is also required. Not only 2D parameter but also 3D height parameter and volume parameters are needed to reliably analyze wear.



The essential evaluation features of the software MarSurf MfM and MfM plus

MarSurf MfM

Basis

- Documentation
- 8 languages
- Tolerances

Depiction and evaluation

- Photosimulation
- False color view
- 3D view
- Abbott-Firestone curve
- 3D basic parameter

Evaluation

- Include / exclude zones
- Zoom, symmetries, rotations
- Surface subtraction
- Repair surface
- Merge surfaces

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MarSurf MfM plus

Basis

- Documentation
- 8 languages
- Tolerances

Depiction and evaluation

- Photosimulation
- False color view
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- 3D basic parameter

Auswertungen

- Include / exclude zones
- Zoom, symmetries, rotations
- Surface subtraction
- Repair surface
- Merge surfaces
- FFT
- Auto correlation
- Intercorrelation
- Special filter methods
- 3D advanced parameters
- 3D motif evaluation
- Peak count distribution
- Spectral analysis
- Island volume

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